# COMPUTERWORLD

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NEWSPAPER

## CW NEWS IN BRIEF

### Afips Awards Pact For System Manual

MONTVALE, N.J. – Work has begun on the first of a series of system review manuals (SRMs) with which the American Federation of Information Processing Societies (Afips) hopes to provide users and the public with a "consistent method of analyzing systems, so as to protect them against poor design or implementation" [CW, April 5].

Afips has awarded a contract to Mary Elizabeth Stevens, an independent consultant long associated with the National Bureau of Standards, to develop the first SRM, dealing with security and privacy problems.

The manuals are expected to be essentially checklists of useful questions applicable to many systems. They will not, however, define what constitutes "good" answers to these questions, according to John Gosden of Equitable Life, chairman of the Afips Systems Improvement Committee which is in charge of the project.

The first SRM should be ready for field testing in about a year, Gosden said.

### Phone Company Reports Now In Punched Card Format

WASHINGTON, D.C. – The Federal Communications Commission has ordered monthly reports from major telephone companies to be submitted in punched card form.

The reports deal with financial, operating and statistical information from the phone companies. Commenting on the move to DP format, GTE Service Corp., an affiliate of General Telephone said it "generally opposed the conversion as cumbersome, expensive and prone to generate errors." AT&T said the punched card format would result in "more efficient collection and dissemination" of data.

Each report containing monthly cumulative operating totals will be contained in 13 cards which will be converted into a standard CPU printout by the commission's Univac 1108, a spokesman said.

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## *Appeal Planned*

# Greyhound Loses IBM Antitrust Suit

By Edward J. Bride
Of the CW Staff

PHOENIX – There was not enough evidence to send the Greyhound Computer Corp.-IBM case to the jury, a federal judge ruled last week in dismissing the 33-month-old antitrust suit.

Last Wednesday, two days after IBM was granted the directed verdict, Greyhound filed a notice that it would appeal the case. The leasing company is expected to file a brief with the Ninth Circuit Court of Appeals within 60 days, an official said.

Greyhound officials declined to speculate on what effect the directed verdict might have on the general user community if the appeal is unsuccessful, and would only say the company was "satisfied" it had an "excellent antitrust case."

The Greyhound statement also suggested "the court erred" in granting the directed verdict to IBM.

Over the last 10 years, Greyhound has purchased IBM second- and third-generation computers, in turn leasing them to customers in competition with IBM. Its suit charged IBM with adjusting prices and other policies to make it impossible to compete.

Judge Walter E. Craig said IBM's pricing, "both in leases and purchases, was brought about by economic factors over which the defendant had no control."

### 'Wrongful Use' Prohibited

Craig also noted "size alone" does not constitute a violation of the Sherman Antitrust Act. "It is the wrongful use and exercise" of monopoly power "which is proscribed" by Section II of the act, he said.

An official of the Computer Lessors' Association (CLA) called Craig's decision a "blow to the industry."

W. Porter Stone also said IBM had allowed the leasing industry to evolve, "and then suddenly slammed the door in its face by very simply changing the ratio of purchase-to-lease prices."

Contacted at CLA's Washington, D.C., headquarters, Stone said "time will tell" what the impact will be on the leasing business, "but clearly it will hurt."

Greyhound had been seeking at least $35 million, which it claimed was lost because of IBM actions which it alleged violated the Sherman Antitrust Act.

The IBM legal force now turns its efforts to the combined antitrust suits of Control Data Corp. and Telex, and to the suit filed almost four years ago by the U.S. government.

Craig ruled that evidence with respect to the computer marketplace, and IBM's "relevant share of the market," was "insufficient to submit that issue to the jury."

Other issues in the case were also resolved in favor of IBM, including the subject of contracts between IBM and Greyhound for equipment purchases and for the providing of services.

IBM said only that the company was "gratified" by the directed verdict in its favor, "which we had hoped for because we felt it was justified by the facts."

Craig told the jury he had tried to evaluate all the evidence presented, after Greyhound rested its case on Friday, July 7. After a weekend deliberation, his conclusion was based "not so much as to what the evidence showed, but what it did not show."

Taking note of the four areas under consideration (liability, contracts, monopoly and illegal use of monopoly power), Craig commented: "Had the court reached a conclusion that the evidence was sufficient in any one of these areas to present to the jury, the court would have done so."

## *New NFPA Standard*

# Halon OK for Center Fires

By a CW Staff Writer

BOSTON – For the first time, the use of Halon 1301 to fight computer center fires has been approved as an alternative or addition to carbon dioxide, according to the National Fire Protection Association (NFPA).

The organization, headquartered here, also called on computer users to adopt methods to "minimize the possibility of penetration" by explosives or incendiary devices aimed at destroying computer installations.

Adoption of the NFPA recommendations by users may make it easier or cheaper to obtain insurance. Many insurance companies use NFPA standards in setting rates or approving new centers, although the NFPA itself does not inspect or certify installations.

An insurance company which underwrites many computer centers is St. Paul Fire and Marine, and underwriter Gordon Paine said it was a "safe thing to say" that adherence to the standard "could bring better rates" to computer users.

The new security clause in the standard notes that many DP installations have become "prime targets" for arson and sabotage. It recommends controlled-access to computer centers at all times.

### Carbon Dioxide

Carbon dioxide requires evacuation of a space before it can be used in quantity to extinguish a fire. A high concentration of carbon dioxide can freeze the lungs or suffocate occupants.

Halon, at the recommended density of less than 10%, is safe to breathe, but it is fully discharged from bottles when a system is activated. The expense of recharging all containers and the possible toxicity of the gas when it breaks down have been cited by its detractors.

The acceptance of Halon by NFPA could lessen the controversy, which had been heightened by some claims that the gas, when exposed to high temperatures, also breaks down into its elements and attacks the copper in wiring.

The NFPA has a separate stand on Halon, but until now had not suggested its use in computer centers.

### Water Still Suggested

The new standard, number 75, also suggests the use of water sprinklers, but says "where the quantity of combustibles is not sufficient to require automatic sprinklers," Halon can be used.

"Where sprinklers are required" because of combustibles, "the addition of an automatic Halon 1301 total flooding system" may be considered "to protect data in process, reduce equipment damage and facilitate return to service," the standard reports.

The standard also cautions users to

*(Continued on Page 2)*

# Do-It-Yourself User Cuts Costs With His Own Operating System

By Don Leavitt and E. Drake Lundell Jr.
Of the CW Staff

CLEVELAND – Sometimes it pays to write your own operating system – especially for limited applications that do not need all the generalized facilities of vendor-supplied control software.

That is exactly what Champion Services Co. did and as a result it is currently handling nearly 200 terminals of various types, in an on-line banking operation, with a 64K 360/30. Using IBM-supplied software, it would have to use a 128K 360/40, according to Champion spokesman, Rick Moore.

### Big Savings

Being able to run its work on a smaller, less powerful processor means real savings to Champion. List price for a 128K Model 40 CPU is $6,650/mo, while a 64K Model 30 costs only $4,030/mo – $2,620 less each month, or $31,440/yr.

Champion, a service bureau specializing in banking and savings and loan applications, has not abandoned IBM's DOS completely; it switches over to that system in the evenings for batch processing when its clients do not require the on-line support.

Champion wrote its on-line operating system only after it had developed design specifications, Moore said. The company did not attempt to strip unwanted logic from IBM-supplied coding to meet these needs, he added.

### Touchy Situation

Stripping preexisting coding is difficult and can be dangerous, since the people making the modifications cannot be absolutely sure of the overall logic of the coding that they did not write originally, Moore noted. Eliminating code at one point may have a completely unexpected

*(Continued on Page 2)*

## City Paychecks Delayed

# Humidity Victimizes DP Cards—But All's Cool in End

By Edward J. Bride

Of the CW Staff

BRISTOL, Conn. – A dispute over a window air-conditioning unit for the city hall computer room has led to $1,000 in programming overtime costs, before the $1,000 for the unit itself could be approved.

Payroll delays of about a day for the city's 1,000 employees have occurred this summer because of excessive humidity in the computer room. While inside temperatures have been reported as high as 88 degrees, it was the 85% humidity which caused computer cards to swell and/or become limp.

Only after the delayed paychecks and programming overtime would the city council spend the funds necessary to buy the small window unit.

The condition of the computer cards caused them to track incorrectly in the small system, an NCR 500 operated by the comptroller department, officials of NCR and of the city said.

The cards are magnetic ledger cards, and the 500 is described as a "visible record" system by NCR; a magnetic strip on the back of the ledger cards contains payroll data and hash totals for computer input.

When the cards became thicker, wider and longer in the humidity, this caused a "drag" in the card reader, according to Steve Brown, DP manager and programming supervisor.

As a result, data was written on data just encoded, causing errors in the hash totals, Brown explained. While the system has no error-check for writing data, he continued, there were "plenty of trails" to detect the problem after the information had been written on the magnetic strips.

The hash totals provided one of these checks, he noted.

### Problem Not New

The environment problem first occurred last year, and can be traced to the fact that the air conditioning in city hall does not remove humidity from the air.

"It's not an air-conditioning system, it's air-cooling," Brown said. "We had minor problems last year," and these problems were correctly blamed on the humidity, he said.

"I recommended getting our own air-conditioning unit, but the problem wasn't too severe," and the request was denied, he continued.

This year, however, with delayed payrolls and perhaps as much as $1,000 spent in overtime to recreate the payroll file, Brown received approval for the window unit, which cost about $1,000 more, he noted.

Before the system could be installed, however, the central "air-cooling" system had to be blocked off from the small computer room, and when *Computerworld* talked with Brown, the temperature in the 15 x 18 room was 88 degrees.

### Humidity Parameters

The humidity parameters of the NCR 500 are 20% to 60%, NCR said, adding that Bristol officials were informed of this fact, which is also included in operating manuals.

The system has been installed for about four years, but was moved to the smaller room about two years ago, NCR related. When this occurred, NCR warned the local DP people that a new unit might be needed to control humidity.

NCR also said nearly 3,000 of the second-generation machines are installed around the world, including over 100 in Army field installations, in jungles, and in "all kinds of rough environments."

The system has 4.8K of memory, and Bristol uses it primarily for payroll, since the paychecks and associated applications take over two days to run, Brown noted.

The problem was solved just in time, with last week's heat wave sending temperatures into the 90's and the humidity close behind. NCR noted that was the "supreme test," but the window unit solved the problem.

NCR also warned that the same type of problem could occur with the standard 80-column punched cards.

The situation was worsened in Bristol because of the "visible record" card, which appeared correct to the eye, but which was incorrect on the magnetic media.

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# Halon Approved for Center Fires

*(Continued from Page 1)*

install Halon systems in accordance with the separate NFPA document, #12A, specifically devoted to the capabilities of Halogenated Fire Extinguishing Systems.

The new standard is not limited to the EDP equipment itself, but includes records, wiring, building collapse and the location of computer installations.

Included in the document, officially entitled "Protection of Electronic Computer/Data Processing Equipment," are damage control and emergency procedures.

In noting security threats to computer centers, the new document says it is "essential" that access be restricted "to only those persons absolutely necessary to the operation of the equipment."

Controlled access must be applied "through positive identification" and must be maintained "at all times," according to the document.

While the new standard covers installations requiring special construction, it can be used as a "management guide" for installing smaller units "that do not require special construction or protection," NFPA said.

## Brochure Available

BOSTON – A revision to the standard for protecting computer centers is now available from the National Fire Protection Association (NFPA) here.

Officially designated NFPA Standard 75, "Protection of Electronic Computer/Data Processing Equipment," the standard was first proposed in 1960, and this is the first revision since 1968.

The current version also incorporates some of the provisions of a 1970 standard on Halogenated Fire Extinguishing Systems.

The 36-page brochure is available for $1.25, from 60 Batterymarch St., 02110.

# User Proves Do-It-Yourselfer

*(Continued from Page 1)*

effect on some other part of the system, he warned.

With its system, Champion is linked by leased lines to a mix of Burroughs, Olivetti and IBM terminals at banks and S&Ls in Pennsylvania, Kentucky and Ohio. The present implementation can support 6,900 transaction/hr, with a maximum response time of four seconds. Printing of batch-generated reports is handled concurrently as a background operation, Moore said.

Champion has begun work on software for a front-end communications processor (probably a DEC PDP-11), in order to increase the capacity of the mainframe without increasing its size.

The company has looked at some commercially available front-end software packages, but said these appear unusable, since most have been designed to link to elements in IBM's standard DOS, Moore said.

He expects, ultimately, to write one system to control both the front-end operations and the mainframe.

### Compact Coding

The compactness of the Champion coding is impressive. The master supervisor takes only 5,100 bytes but is equivalent in function to the DOS supervisor which takes a minimum of 6K bytes. The communications I/O Control System including queuing support and buffers uses 7,100 bytes, in contrast to IBM's Btam which requires 24K bytes.

File I/O Control System including the pre-seek logic is complete in 12,800 bytes and is equivalent to IBM's Basic Direct Access Method (Bdam) and Isam logic. Terminal servicing for all 192 terminals now in use requires 5,300 bytes, Moore said.

Disk file updating, the real application for which the system was written, takes nearly 14K bytes.

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MEDIA MANAGEMENT SYSTEMS

### Agencies Balk at Disclosure Bill

# Government Admits to Over 165 Million Records

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – Federal officials admitted to keeping records on more than 165 million Americans who would all have to be notified if the Citizen's Privacy Act is passed.

All of the federal officials opposed the bill at recent hearings, citing the burden that would be placed on agencies if they had to notify everyone whose name was contained in a computerized data bank.

At the same time, Rep. Edward Koch (D-N.Y.) told the hearings that technological advances in the areas of data storage and retrieval along with a seemingly lenient attitude toward government data bank operations on the part of the present administration are "fraught with danger."

Speaking at the opening round of hearings on the act [CW, June 28], Koch called for immediate congressional action to protect the privacy of U.S. citizens from governmental data bank operations.

The hearings signaled what promises to be a long debate on privacy and data banks as both Republicans and Democrats are expected to focus on the issue of government surveillance.

At the hearings, Koch said "all of our governmental agencies appear to be competing to compile the most extensive set of dossiers on American citizens. The Transportation Department, the Civil Service Commission, the Justice Department, the Department of Housing and Urban Development, the State Department, the Treasury, the Department of Health, Education and Welfare and others are all engaged in similar activities."

The 165 million government records were identified at the hearings as divided between the Department of Defense which maintains 12 million on employees of contractors; the General Services Administration which admitted to 68 million records on civilian personnel and 50 million on military personnel; and the Veterans Administration which admitted to 35 million personal records.

### Other Records?

But even this does not indicate the full extent of governmental record keeping, sources said, noting that the Civil Service Administration alone maintained millions of records not counted in the figures released at the hearings.

And not all of the records are of recent origin. For example, the General Services Administration said the files it maintained on military personnel dated back to 1885.

"We have not yet established a maximum retention period for these records," admitted Sidney Weinstein, deputy assistant administrator of the Office of Automated Data Management Services of GSA's Federal Supply Service.

The notification of everyone in the files of the Veterans Administration "would result in a major increase in the work load of this agency," Rufus H. Wilson, VA associate deputy administrator, emphasized.

In addition, he said the bill "could materially interfere with the agency's performance . . . in ways other than increased administrative work load. Agency medical personnel might be hesitant to fully discuss mental and serious physical problems."

Wilson could not estimate the cost of the bill to the agency but admitted it would be "substantial" and urged rejection of the act.

All the government officials at the hearings echoed his feelings on the costs and emphasized that government records were secure from unauthorized disclosure and were only available to officials with a right to know.

In his testimony, Koch said that "so long as we have a large governmental structure, and so long as the military apparatus is a major economic and administrative factor in American life, we will always have governmental – and military – records and investigations of American citizens.

"Second, we know enough about bureaucracy – public and private – to know that bureaucrats feed upon the expansion of power and information. With respect to military surveillance, it appears that from an initial mandate merely to prepare contingency plans to deal with authorized involvement in riot situations, the Army expanded its role to maintain records about, and to spy on, citizens who might conceivably be unsympathetic to present governmental policies.

"Third, modern computer technology permits the most extensive collection and retrieval systems for information.

"Fourth, the best way to prevent the erosion of liberties is to establish as many countervailing forces as we can on the abuse of power."

Under the bill, as Koch outlined it, "each agency which maintains records concerning any individual – including those records which may be retrieved by reference to the individual's name – must notify the individual that such a record exists; notify the individual of all transfers of such information; disclose the information from such records only with the consent of the individual or when legally required; maintain a record of all persons inspecting such records; permit the individual to inspect his records, make copies of them and supplement them."

Opponents of government data banks noted the present bill would not require the destruction of legitimate governmental records, but did admit it would cause inconvenience to government record keepers as they attempted to notify the millions of people concerned.

The bill, some admitted, would make it difficult for the government to keep unnecessary records on individuals, therefore accomplishing a large part of its purpose immediately.

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## Technology/Society--Part I

# DP Community Guilty of Civic Fraud?

*This is the first part in a series on the conclusions drawn from the eight-year Harvard study of the relationships between technology and society.*

By E. Drake Lundell Jr.
Of the CW Staff

CAMBRIDGE, Mass. – Claims in the 1960s that comprehensive information systems would soon enrich governmental policy-making have not been fulfilled, suggesting a "case of civic fraud" on the part of the computer community.

That is one of the conclusions from Harvard University's Program on Technology and Society, which issued its final report recently.

The program, which had been in operation from 1964 to this year, was supported by IBM, but funds are now being diverted to professorships instead of the research program.

One of the early findings of the study, conducted by Alan F. Westin of the project, is that there is still "hardly any information system . . . having any significant effect on strategic or tactical decision-making in executive branches of government at any level.

"Some of the 'most advanced' (and most publicized) systems are already out of business, the victims of factors such as post-1968 economic conditions, poor performance on promised benefits and a growing skepticism among government administrators about blue-sky information system designs," Westin charges.

Most of the systems still existing, the Westin research indicates, "are geared to automation of existing program operations or of similar programs mandated by new legislation.

"Scores of handsomely printed long-range plans and feasibility studies speak confidently of affecting higher decision-making levels by producing information geared to program evaluation, alternative policy formulation and testing and information systems for top management.

"But," he charges, "no data bank has been found in civilian agencies of city, county, state or federal government that is in fact delivering on such promises."

### 'Pretentious Plans'

Because of the failure to develop any such systems as promised, Westin suggests that "perhaps their pretentious system plans, with their naive treatment of administrative and political realities and their inordinate faith in the power of information were only 'funding language,' a special form of literary expression for charming the holders of grant and tax money into underwriting what is presented as sweeping reform, but actually amounts to modest experimentation."

Westin also says that "one is led to ask whether the contrast between the simmering visions painted by computer manufacturers, software firms and allied consultants in the early 1960s and the bleak record of accomplishments as those of 1970 suggests a case of civic fraud.

"Enormous sums of money from public treasuries were spent to buy computers and peripheral equipment as well as expensive consulting services to recommend, design and install information systems.

"This may represent," he notes, however, "a typical instance of early development costs of a powerful tool before its true potential is realized. Furthermore in a capitalist system, with its basic principle of *caveat emptor*, the political answer may be that the consumer (even the government consumer) has to learn through some costly experiences just what the new mousetrap can and cannot do."

### Consolidating Power

Westin also concludes that computers at work in government have been "a factor in consolidating rather than in redistributing governmental power; computers and their associated equipment are fearfully expensive, and the poor, the black, the students and the antiwar movement cannot harness computers to their causes.

"Also to the extent that organs of government might adopt restrictive policies toward the civil liberties of dissenters or the socio-economic claims of the poor and the black, there is little doubt that information technology can make the execution of such policies more efficient."

The failure to develop such systems, Westin notes, has somewhat overcome the fears "that computers and telecommunication systems would lead to the capture of decision-making by 'the machines,' or at least those technicians and superiors who controlled the information systems.

"Whatever the facts in the military and defense intelligence areas may be," he states, "there has been no such takeover yet in the civilian agencies of American local and national government.

"The distant future may tell a different story, but in the early 1970s it requires a powerful flight of ideological or philosophical imagination to go from the current pedestrian uses being made of computers to move paper and perform basic transactions to anything resembling sophisticated data-rich decision-making; nor is there the slightest sign of displacement of traditional leadership elites of top and middle management in government by information specialists," he concludes.

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# No People Allowed

Special to Computerworld

SANTA MONICA, Calif. — When Maurice Wooden sets his computerized dating service into motion, there is almost always a happy ending even though the participant invariably winds up with a real dog.

Wooden, 43, is a matchmaker for dogs, operating Apollo Canine Dating Service, specializing in "personalized canine mating." It claims it can "make exciting things happen to your best friend."

So far, 75 "romatic holidays" have been arranged by Wooden. He has 300 studs and females registered and his listings are processed by a service bureau.

The service was started about a month ago and was based on the fact that many dog owners have difficulty in locating a mate for their pets. One client wanted and got a mate for her blue-coat Chihuahua bitch, valued at $5,000.

There is a charge of $20 annually to list a stud and $5 to owners of females. There is a free listing of puppies and Wooden also provides a clearinghouse for purchase and sale of dogs.

Many dog owners have problems locating mates because kennels are primarily concerned with one or no more than six breeds, Wooden said.

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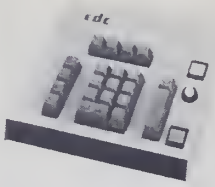

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# Calif. Centralization Gaining

By Marvin Smalheiser
CW Correspondent

SACRAMENTO, Calif. – Efforts are under way to implement a state electronic data processing master plan to reduce the number of processing centers from 25 to five and save an estimated $185 million in the next five years.

Funds totaling $30 million for operation of the data centers were approved and included in the newly adopted state budget for 1972-73.

A bill is pending in the state Assembly which will give the governor the right to appoint data center directors and formally establish the centers. No significant opposition is expected.

### $83 Million Expended

Expenditures for EDP by the state were in excess of $83 million for the 1971-72 fiscal year and have been approaching 4% of the entire state budget. The master plan report said that unless centralization was undertaken, EDP costs could reach $200 million or more per year in 1975.

G. Lee Smith, state data processing officer, said the first move to centralize the state's data processing operations will come soon when an IBM 370/165 will be installed at the Department of Public Works to replace a 360/65. It will be joined later by another 370/165 to form the heart of a Business and Services Center – one of five centers that will handle the state's data processing.

Two of the other centers are now up and operating – the State Colleges and Law Enforcement centers. The other two will be a Revenue Center and Human Relations Center.

The master plan report said the failure of the state to approve centralization would result in the loss of an opportunity "to achieve cost avoidance of $988,000 per week."

Other benefits cited are decreased support staff size, decreased application turnaround time, increased power per dollar invested, decreased storage cost, increased efficiency of hardware utilization and increased leverage of incremental work.

### Hardware Consolidation

The primary concentration in the implementation of the plan will be in consolidation of hardware, hardware operations and system programming support.

The goal in centralization is to establish large-scale, centrally located computer utilities to provide statewide teleprocessing networks with shared usage capability, planned backup and in-line upgrades to newer hardware.

The computer utility approach will provide state agencies with remote batch entry, large-scale, on-line interactive computing, massive data base operations, selected conversational remote batch and typical standard data processing.

The mainframes, except for the first 370/165, will be acquired through competitive bidding.

The Law Enforcement Center now has five Univac S/70s and one RCA 301. The State Colleges Center has 13 CDC computers and seven IBM 360s. The Revenue Center will have a 370/145 and 155. Hardware for the Human Relations Center has not yet been determined.

The Revenue Center is expected to be fully operational by the end of 1973; the Business and Services Center, 1974; and the Human Relations Center, 1974 or 1975. The centers are to be created gradually through consolidation and upgrading of existing facilities now in use by state agencies.

All consolidated data centers will use the most current, unmodified versions of the respective vendor-supplied control software, operating system, compilers and assembler according to the master plan. The standard business language for all centers will be ANS Cobol.

### 100 Job/Hr

Each data center will be expected to handle more than 100 job/hr. The jobs will originate from at least 10 different departmental locations and from nearly 20 remote locations.

A software system, the Attached Support Processor (ASP), will be used to balance workloads between multiple computers or duplex configurations. It will also be used for increased automation of the computer management operation.

It will decide on a moment-by-moment basis which of the computer processors in a center will be used for which job and will make decisions at the required rate to support the capacity of each large-scale central facility.

A key element of the master plan is a concept of progressive upgrading of the large-scale central computing facilities with remotely located satellite miniprocessors of varying sizes and capabilities.

Rates and fees will be determined by a computer utility rate board system.

# Senate OKs Bike Theft Bill

SACRAMENTO, Calif. – A bill aimed at cutting bicycle thefts by putting data about bicycles into the state's computerized criminal information system has been passed by the Senate, 31-2, and now goes to the state Assembly for action.

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## Work Done Simultaneously

# Everyone's Equal in This Hospital DP Cooperative

By Molly Upton
Of the CW Staff

MILWAUKEE – Arrangements for sharing data processing services and expenses are almost as varied as the individuals or groups participating in the sharing venture.

Medistat, a cooperative DP project between Wisconsin Blue Cross and several hospitals, is in the process of expanding its capabilities to include on-line laboratory test data collection as well as patient accounting.

Al Cusick, manager of Medistat, advocates the "true shared data processing environment," where "nobody really gets priority over anyone else. Everybody's work is done simultaneously. If one is delayed, everyone is."

Such an operation needs a big machine, and a fairly large number of hospitals to support it and make it economical, but once running, it is very economical for the hospitals participating, he noted. Far more so, for instance, than having each hospital acquire an IBM 360/20 or System 3 and trying to get data through.

Often, when several small hospitals get together and put in a small system in one site, with the rest hand carrying cards over, "pretty soon one becomes dominant somewhere along the line, and people start suffering," he observed.

If organizations are using their DP to put out only "bills and statements, they are using it as a fast typewriter, and not taking advantage of byproduct data, automatic interrelationship billing, accounts receivable, general ledger and all financial data," Cusick noted.

The advantages of a shared operation depend in large part on how the shared center is operated. "If it's as a service bureau, you have got some of the same type of restrictions of a typical service bureau: the 'here is what we have to offer, take-it-or-leave-it approach.'

"Here we function as a cooperative, with monthly meetings with administrators of all the member hospitals, and also with the systems person for each hospital," he said.

### Spotlight on Sharing

"If the majority of hospitals don't want something, we still will do it, but sort of on a service bureau basis for the individual hospital."

In addition to providing patient accounting [CW, June 21], Medistat is developing what it calls one of the first shared computerized on-line hospital data collection and laboratory information systems of its kind in the U.S.

Five hospitals have signed up to participate initially in the Medistat Clinical Laboratory System: Milwaukee Children's, Columbia and Doctors in Milwaukee, Kenosha Memorial and Waukesha Memorial.

The project will use the IBM 370/155 currently installed at the Medistat center, which now handles patient acocunting, and two Tempo 1s at the center, which will perform the majority of the lab processing, storage and report preparation.

Each hospital will have a Tempo M to act as a controller and concentrator performing minimal processing. The system will directly interface with several laboratory analysis units, such as the Technicon SMA 12/60 or SMA 6/20, and Coulter Counter Models F and S. Special keyboards in labs will permit direct entry of other clinical data, Cusick explained.

Data will be interchanged between the 370 and the Tempo 1s. Charges for lab tests will automatically be entered into the Medistat patient accounting system run on the 370. "The lab system will not be a slave to the 370 but will really be a mass terminal supplying additional information to the 370, cutting down on hospital work in terms of passing charge data, instead of the hospitals having to create it and keypunch it."

Lab tests in the hospitals will be monitored by the hospital computer, and physicians will be able to receive a printout of lab results or answers to queries on a CRT screen as soon as the tests are analyzed.

This information, transmitted to and stored on the central Medistat computer, can be used repeatedly by the hospital and physicians.

The software was designed with seven hospitals in mind, so "we built into this system a lot of features not available on the commercial market," Cusick noted. "The software was designed in such a way that a children's hospital can just as readily use our system as an acute care hospital without modification," Cusick claimed.

## Perry Notes Trend Toward Consolidation

BRETTON WOODS, N.H. – Because of the massive power of computers there is a growing trend toward cooperative sharing among government agencies, schools and hospitals in this country, according to Alva R. Perry, vice-president of Honeywell Information Systems (HIS). "This is because heavy expenses can be borne more readily by a number of departments or agencies, yet at the same time they can derive greater benefits by using a common bank of data."

Perry said he saw a trend toward consolidation of computer resources in state and local government to take advantage of common banks of data, professional and technical personnel and other cost efficiencies.

"This is a departure from the way it was 10 years ago," he noted, "when each major government agency had its own computer. Politics always seemed to play an important role, and the result more often than not was that an agency selected a computer based on manufacturer reputation or on a recommendation from higher-ups."

The computer is becoming a tool of the taxpayer and "this should go a long way toward eliminating politics in decision-making at state and local government levels," Perry also stated.

Addressing the American Association of Motor Vehicle Administrators, Perry said: "The public, with the help of the news media, is demanding that government officials find ways of economizing as the ever-increasing tax bite chews a little bit out of everyone's wallet."

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# *Editorial*

## *Wrongful Use of Power?*

The wrongful use and exercise of monopoly power is proscribed by the Sherman Antitrust Act.

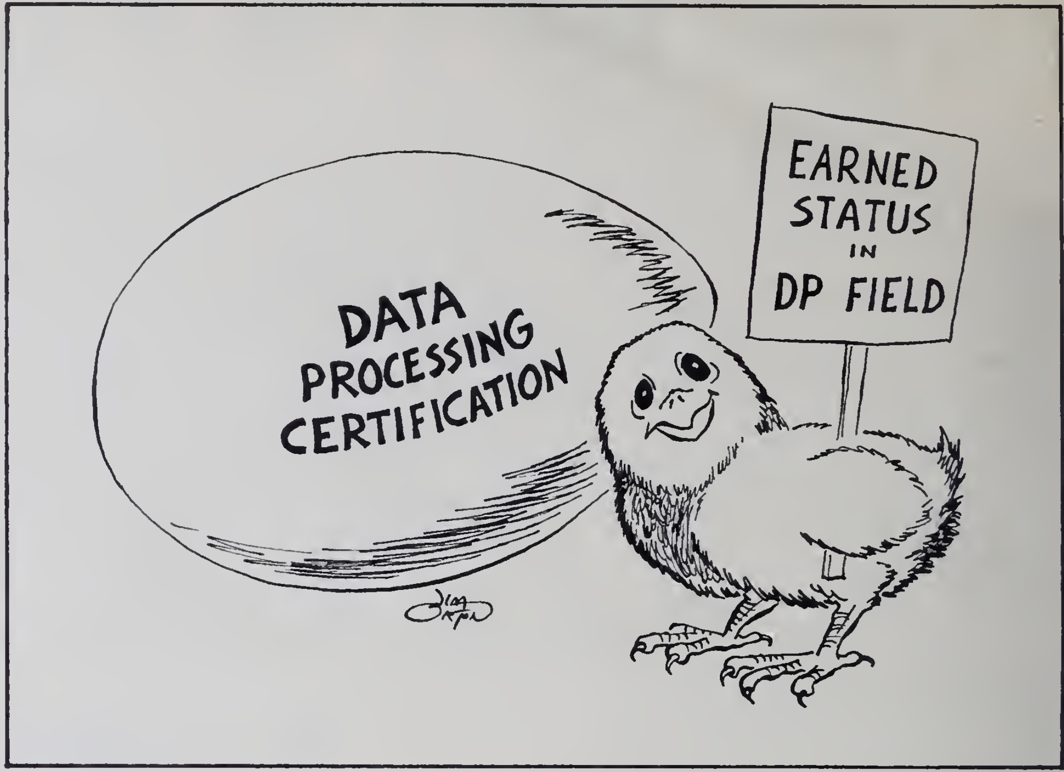
The data access arrangement, the Bell System protective interface required between customer-supplied equipment and the telephone dial-up network, represents an interesting display of monopoly power.

The monthly charge (penalty fee?) that Bell collects for a DAA from every customer who refuses to lease Bell modems represents an automatic price advantage to Bell in competing with the independent modem manufacturers.

Any businessman would love to have a market advantage like that, especially when the whole thing has the tacit approval of a federal agency, in this case the Federal Communications Commission.

Since Bell seems to be dragging its feet in working out a non-discriminatory solution to the protection problem, perhaps the Justice Department should take a close look at the whole situation.

## Which Comes First?



# *Letters to the Editor*

## 'Bull Session' Fruitful For Insight Into Standards

It would appear that the "bull session" at the June Society of Certified Data Processors Boston chapter meeting was attended by persons having good insight in the area of data processing standards. While the "lists" developed require refinement, they certainly reflect a good preliminary thought process among the attendees.

When reading the Taylor Report [CW, June 21], I could not help but note the similarity between the lists the SCDP people created and lists created over the past several years by the Guide International Corporation – Installation Guidelines and Standards Group.

I know you are familiar with Guide International; however, you and the SCDP membership may not be cognizant of the activities of the Installation Guidelines and Standards Group within the organization. The group was chartered within Guide in 1970 and is presently contained within the Languages and Standards Division of Guide International.

The objectives of the group are threefold:

- To promote standards within the data processing community.
- To offer guidelines in the development of effective data processing standards and standards programs.
- To provide materials useful to the data processor in developing, implementing, maintaining and enforcing standards.

Robert G. Smith

Warner-Lambert Co.
Morris Plains, N.J.

## What Are Percentages Of Certificate's Success?

I have for some time read with interest Alan Taylor's articles on the need or desire for a CPA-like certificate in data processing.

If the DPMA CDP certificate is ignored, will not the CPA-like certificate be ignored? If the majority of individuals responding to the survey in a positive way are non-CDP holders, then the new certificate has a good chance of fulfilling its mission. What are the percentages?

Thomas C. Bartz
Manager-Systems

Beatrice Data Center
Chicago, Ill.

## More Appropriate Goal Is Auditing, Not Inspecting

There is serious question as to the value of the inspection as described in the June 28 Taylor Report. For example, in accounting there is a "principle of materiality" which holds that strict adherence to accounting principles is not required for items of little significance.

Under an "inspection" system it could be held that a given application has not met a given standard, while under an audit system the application could be passed if, in the considered judgment of the auditor, the deviation from standard is not significant in the particular situation under review.

It is appropriate to add it is not unusual for an auditor to furnish not merely a certificate as to current status but also a report setting forth his judgment and recommendations concerning potential problems. He may, for example, find that a particular procedure being used does not provide adequate control.

If he found no evidence that the inadequate control had caused problems, he could issue a certificate; however, his detailed report could indicate that future certifications would be dependent on revision of procedures in question.

It is, consequently, my opinion that auditing, not inspecting, is the more appropriate goal, and that those who engage in such auditing activity must be prepared to risk the professional careers on their judgments just as the CPA does.

Arthur F. Kaupe Jr.
Director, Systems Design

Western Institute for
Science and Technology
Waco, Texas.

# DP Certification Not Like CPA Audit

By Gabriel G. Tashji
Special to Computerworld

Several articles in *Computerworld* pertained to the development of a DP professional certificate, similar to the CPA accounting profession.

As a professional accountant and auditor, and currently working as an EDP systems audit analyst, I found the analogy of the CPA to DP certification inconsistent with business management philosophy, and the overall concept of protecting public interest, namely, the investor.

Data processing is simply a means or a method by which input data is converted or manipulated to generate the desired final output, in a similar manner to a production plant which converts/manipulates raw material (input) to generate the desired final product as output.

A CPA certification generally reflects and supports the overall financial position of the company as of a certain date in monetary values. However, in data processing there is no unified measurable value against which all system applications and operations can be measured.

For example, how could a poorly designed system application be measured? Or, let us say, inadequate documentation? How about inefficiency in machine utilization, or processing under emulation?

It seems to me after being in this profession for the last 10 years, starting with EAM and second-generation SPS (Autocoder) programming, and continuing into third-generation computer and programming languages (Cobol, RPG and BAL) that there is a big difference in audit approach and technique between EDP and financial audit.

Generalized audit packages such as Audassist, Auditape and Cars 2, which utilize retrieval and manipulation of data, are merely an extended phase or tool to financial audits, and, technically, I am not referring to them here as EDP audit approach.

## *Viewpoint*

While sampling techniques are an acceptable practice in financial audits, this technique, however, is totally unrealistic in EDP audits. For example, a financial auditor is permitted to select at random or stratified (depending on materiality) certain data and test check.

Based on the result of this test, he can determine the reliability of the assets/liabilities reported on the books of the company. However, in an EDP audit, the practice of selecting certain system applications and test-checking certain programs at random (or stratified) within each system application does not provide the same degree of reliability.

The reliability of a system application is measured by evaluating and testing in total all its parameters and processing functions associated with that system.

In addition, data processing is dynamic in nature and constant exposure to technological advances makes it difficult to harness the EDP certification in a similar form adopted by the accounting profession.

I believe the DP profession could provide a unique service to management in the area of systems audit, while the accounting profession performs the data audit function. A systems audit would generally constitute review and evaluation of the following:

- System design and logic.
- Programming logic and language.
- Operating system, compiler, etc.
- Computer configuration and peripheral units.
- Computer operation.
- Machine utilization.
- Planning and scheduling – real-time/multiprogramming environment.
- System back-up.
- Software security.
- Documentation.

In conjunction with the above, a DP professional would verify that the system provides adequate controls, such as input validation, overflow indicators, restart procedure, etc., and certify whether the application is fulfilling or capable of meeting the desired user's objective – also, that the system is consistent with corporate policies and procedures.

Ideally, DP professionals should concentrate in the area of systems and logic, and submit their findings along with any recommendations in the form of an audit report or inspection letter. I would suggest the report include in detail a list of the individual system(s) reviewed and tested in accordance with accepted practices and standards. A committee representing the DP profession would be responsible for establishing policies and guidelines related to acceptable practices and standards.

The evaluation process for each system application tested can be represented in the report by a grading system. The grading system would indicate the quality such as the level of technical ability, efficiency and sound logic instituted in an application as compared to similar applications within the industry or type of industries having comparable configuration.

*Tashji is an EDP management analyst with Continental Can Co., Inc., New York.*

## Firm Remiss in Response

# Complaints Handled Arrogantly

**The Taylor Report**
**By**
**Alan Taylor, CDP**

Some time ago I wrote about the arrogant systems analyst, and the problems he created between data processing in general and the general community. One of the examples used to illustrate the article was a bill from the local Blue Cross/Blue Shield organization which I had just received, and which demanded that it be returned with my payment – thus leaving me with no copy for my records.

This was a typical arrogant demand which I feel contributes to the anti-computer feeling then prevalent, and which still exists (Blue Cross still uses this style of bill, incidentally.)

But arrogant analysts are not the only source of public aggravation with computers. Another source is the equally aggravating actions of ineffective complaint handling, which also occurs in the DP industry. This is just as serious – or perhaps more serious – as the original problems within the DP system, because here we really have the opportunity to make friends – and often end up making ourselves enemies.

Curiously enough, Massachusetts Blue Shield has again provided me with an example of poor complaint-handling practices which can illustrate my point.

This example came in response to the publication of two cards I had received from the firm [CW, June 7], both about a claim 0811764 that I had previously never heard of. The forms were published as examples of poor data processing practices which readers had been complaining about and I asked readers to send in their suggestions as to what improvements were needed.

### Readers Also Confused

And some readers, realizing the confusion was real, did write in. Their comments were often based on the poor positioning of the codes for plan and service type. (The main confusion arose because the cards seemed to refer to a claim, which can be made up of a number of separate billings, when they were actually referring to a specific service billing within the claim. In fact, the readers were confusing the line item on the claim with the document itself.) But this was not the only item that drew their attention.

Framingham O, as a doctor's name, brought cries of disbelief; lack of item numbers to separate the line items all received comment. In fact, there were several points readers discussed. I expected this, because I had found eight points, and had indicated as much by saying there were fewer than on a recently printed school report. (That had more than 90 points identified there!)

### Blue Shield Response

Blue Shield also responded to me – but it did not bother to address any of these points. Assuming the response was the same that a normally complaining inquirer would have received, I found it quite aggravating – one which could easily hurt, rather than help. the relationship between DP user and DP usee.

The writer, a vice-president who subsequently told me he was not involved in data processing, admitted there were problems. ". . . the notices may appear to be contradictory at first glance," he wrote. He was apparently quite oblivious that this in itself is a cardinal sin, so far as good data processing practices are concerned. He even said the firm was going to do something about it – as a byproduct of a new claims processing system.

Despite this, however, he did not appear to think anything was wrong. It was only an apparent contradiction he talked about. No mention was made of any real contradiction – or of any of the other areas that might be poor DP practice. And no explanation was given of how such a confusing practice arose, nor was an apology offered for any inconvenience.

Factually then the vice-president missed many things (see Table 1). This is aggravating – and suggests that one area where improvement is possible is in the handling of DP-related complaints. So let us look for a few methods of avoiding this unnecessary aggravation by finding the basic rules for complaint handling.

First of all, I think the complaint should always be carefully and correctly stated. My complaint was that the forms were confusing. Blue Shield never responded to this complaint. That aggravated me.

Then surely the full complaint should be dealt with. The article indicated that a number of points were involved. Blue Shield responded to only the one point – and left the others unreferenced. True, it did not know them in detail, but it could still have referred to them and asked about them.

Finally, I think that apologies are in order when our systems are to blame. Blue Shield was accused of being confusing – and admitted that the forms seemed contradictory. Surely a straight apology should have been included in the interests of good community relations.

For good relations can be destroyed just as easily by poor complaint-handling practices as by arrogant systems analysis. We are beginning to get rid of the systems analyst problem – so let us not ignore the complaint handling area. It is our concern.

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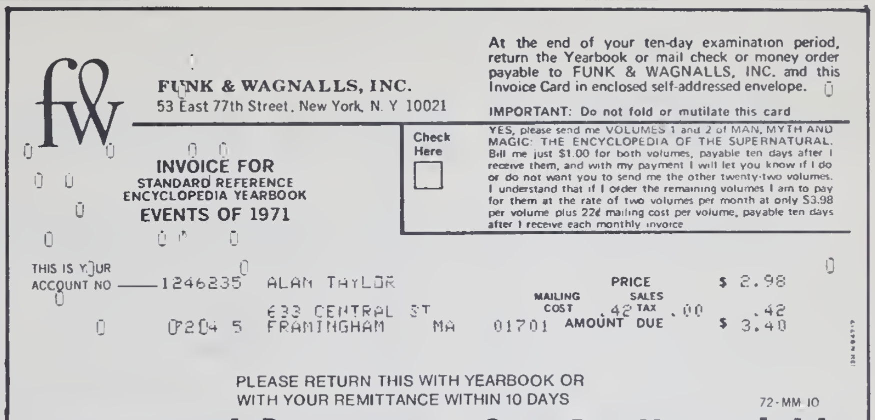

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|---|---|
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| MAILING COST .42 SALES TAX .00 | .42 |
| AMOUNT DUE | $ 3.40 |

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WITH YOUR REMITTANCE WITHIN 10 DAYS

72-MM-10

## Turnaround Documents Can Be Unreadable

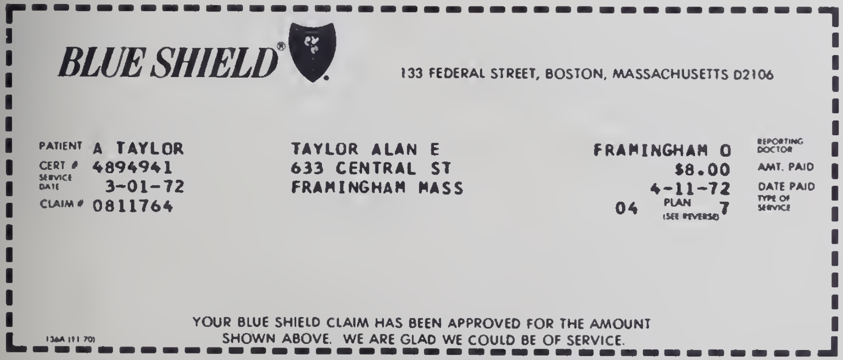
The potential aggravations that can arise as a result of the use of turnaround documents is illustrated with the card sent to me by Funk & Wagnalls in early July. The bill showed a "Mailing Cost" of 42 cents – while the actual mailing fee was only half that – 21 cents. The order for over $90 worth of goods and the condition under which it could be cancelled was included at the end of nine lines of fine print that had to be sent back, and nowhere else in the enclosed literature.

Moreover, the use of stylus printing, with dots dropping in and out of the characters, shows the possible danger of bills being read incorrectly by the recipient. (Additional dots appear in both 2s of the account number, and dots are missing in the second 3 of 633 and the N, T, R, A, S and T of Central Street.)

## Poor DP Practices Illustrated in Mass. Blue Shield Forms

| Poor DP Practice | Example of Poor Practice Used on Blue Shield Form |
|---|---|
| Provision of inaccurate information | • Framingham O is not a doctor, although shown as such.<br>• Claim 0811764 does not belong to the addressee (in this case Alan Taylor) although called "your claim." |
| Provision of confusing information | • Meaningless, numeric coding is used for plan and type of service, instead of meaningful alphabetic abbreviations or full printout.<br>• Placement of numeric coding for type of service on acceptance form is such that it can be read to refer to the plan, not the service.<br>• Codes actually printed are not in accordance with the form of coding shown on the key. Computer codes have leading zeroes left in – but the legend does not. |
| Provision of contradictory information | • Claim 0811764 is said on one form to be approved, while the other form says it cannot be approved. |
| Provision of data against public policy | • Public policy calls for use of Zip Codes in data processing. The forms were sent through the mails, but were not zipped. |
| Provision of unintelligible information | • Truncation of doctor's name field left Framingham O unintelligible. |

Table 1. The eight examples show the type of poor – although not currently illegal – data processing practices which could be noted on the illustrated Blue Shield forms.



BLUE SHIELD® 133 FEDERAL STREET, BOSTON, MASSACHUSETTS 02106

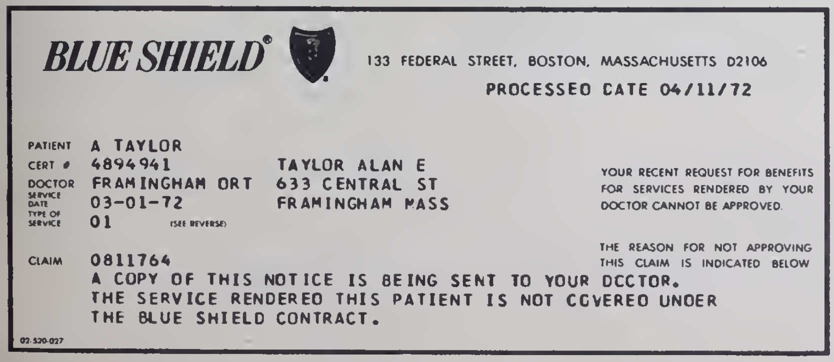
PATIENT A TAYLOR
CERT # 4894941
SERVICE DATE 3-01-72
CLAIM # 0811764

TAYLOR ALAN E
633 CENTRAL ST
FRAMINGHAM MASS

FRAMINGHAM O REPORTING DOCTOR
$8.00 AMT. PAID
4-11-72 DATE PAID
04 PLAN (SEE REVERSE) 7 TYPE OF SERVICE

YOUR BLUE SHIELD CLAIM HAS BEEN APPROVED FOR THE AMOUNT
SHOWN ABOVE. WE ARE GLAD WE COULD BE OF SERVICE.

136A (11 70)



BLUE SHIELD® 133 FEDERAL STREET, BOSTON, MASSACHUSETTS 02106
PROCESSEO CATE 04/11/72

PATIENT A TAYLOR
CERT # 4894941 TAYLOR ALAN E
DOCTOR FRAMINGHAM ORT 633 CENTRAL ST
SERVICE DATE 03-01-72 FRAMINGHAM MASS
TYPE OF SERVICE 01 (SEE REVERSE)

YOUR RECENT REQUEST FOR BENEFITS FOR SERVICES RENDERED BY YOUR DOCTOR CANNOT BE APPROVED.

THE REASON FOR NOT APPROVING THIS CLAIM IS INDICATED BELOW

CLAIM 0811764
A COPY OF THIS NOTICE IS BEING SENT TO YOUR DCCTOR.
THE SERVICE RENDERED THIS PATIENT IS NOT CCVEREO UNOER
THE BLUE SHIELD CONTRACT.

02-520-027

**KEY TO TYPE OF PLAN**

1. USUAL AND CUSTOMARY – BASIC
2. PLAN B
3. USUAL AND CUSTOMARY WITH P.I.C.
4. PLAN B WITH P.I.C.
5. MASTER MEDICAL (PLAN B)
6. FEDERAL HIGH OPTION
7. FEDERAL LOW OPTION
8. PLAN B (REVISED)
9. MASTER MEDICAL (USUAL AND CUSTOMARY)
10. PLAN B WITH SPECIAL BENEFITS
11. OTHER

**KEY TO TYPE OF SERVICE CODE**

1. MEDICAL SERVICE
2. SURGICAL SERVICE
3. OBSTETRICAL SERVICE
4. ASSISTANT SURGEON
5. SURGICAL AFTERCARE
6. ANESTHESIA
7. DIAGNOSTIC X RAY
8. ENDOSCOPIC SERVICE
9. X RAY THERAPY
10. DENTAL SURGERY
11. LABORATORY
12. CONSULTATION

The June 7 Taylor Report asked readers to point out any poor DP practices they noted in the above example, and give suggestions for their improvement.

Typical responses included those from Richard Bustamente, Memphis, who felt the plan and type of service were printed in the wrong places, and that the plan key needed a better explanation.

C. Sgro, Long Island City, suggested that item numbers should be used to help the user decipher the form with less confusion.

CONFIDENTIAL BOX SERVICE
FOR ADVERTISERS who do not wish their names or addresses to appear in their ads, Computerworld offers a confidential box service. To take advantage of this service, simply state in your initial order that you would like a "blind" ad. Computerworld will then assign your ad a box number and forward all replies. The cost for this extra service is only $1 per ad per insertion, no matter how many replies are received.

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## *Instant Displays for Retrieval, Update*

# Linked Data Bases Smooth Order, Warranty Programs

Special to Computerworld

CHICAGO – Total response to customer needs is a way of life at Sun Electric Corp. – and it takes some doing.

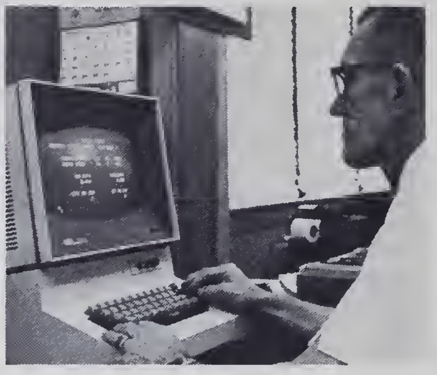
The firm produces 850 automotive diagnostic test products, such as exhaust emission testers and vehicle performance testers, involving 20,000 parts and components. While Sun Electric has 350 sales-service representatives nationwide, supported by 35 regional sales-service centers, finished inventory is kept to an absolute minimum.

In less than a year, Sun Electric installed a comprehensive 360/30-based communications system that handles order entry, production inquiry, warranty inquiry and materials management.

A sizeable, carefully structured data base is essential to support the production inquiry program. This is provided by six interrelated master record files on magnetic disks under computer control. The files are updated continuously by computer processing of receipts, issues and job progress transactions and by file maintenance runs to reflect new engineering releases, changed cost standards, revised job routings and other changes.

A significant file is the parts master. In addition to parts descriptions and stocking locations, and on hand, on order and back-order totals, the record for each part includes dual-standard manufacturing/accounting costs, a month-by-month forecast of usage six months into the future and 12 months of issue history, minimum stock order points and the lead times to make or purchase.

Interlinked with the parts master is a product structure data base which provides a single-level bill of material for each part, and shows the material and component quantities required to produce the part, the using department at the bill level and whether it is an issue part, a made-on-the-line part or a subassembly part.



The display terminal is in the inventory and production control department. By keying in part numbers and inquiry codes, department personnel can obtain information on inventory status at any of the 35 branch warehouses, as well as parts cost data and routing and manufacturing information.

The parts master data is further linked to a work-center master which identifies the work center that produces the part. The file provides a labor breakdown (number of workers) required to produce the part within six different elapsed timeframes. A routine file spells out the work sequence necessary to make the part, and the setup and run times for the machines involved.

The interrelated data base concept is also used in Sun Electric's on-line inventory and warranty information programs. In these systems, the IBM 2260 CRT terminals are used not only to retrieve information from the files, but also to enter new information into the master records. These data bases are used to store current data on finished product inventories, and current and historical information about product sales – by serial number and by customer.

The inventory and warranty segments of the data base are, in turn, created and updated by another on-line communications program: order entry. The local visual terminal units are used to enter order details as they are received from the field. The order entry system is actually used to record pertinent details of sales already made.

Inventory reporting is centralized here, and all orders are processed to facilitate inventory control, as well as billing, warranty control and sales reporting. When sales information is received from the field, CRT terminal operators use the keyboard to enter pertinent data – customer names and addresses, dealer codes and sales ticket numbers, amounts of sales and the serial numbers of the products sold, and, in the case of non-serial items, the quantities sold. The computer processes the data to create and update the corresponding master file records.

### On-Line Exchange

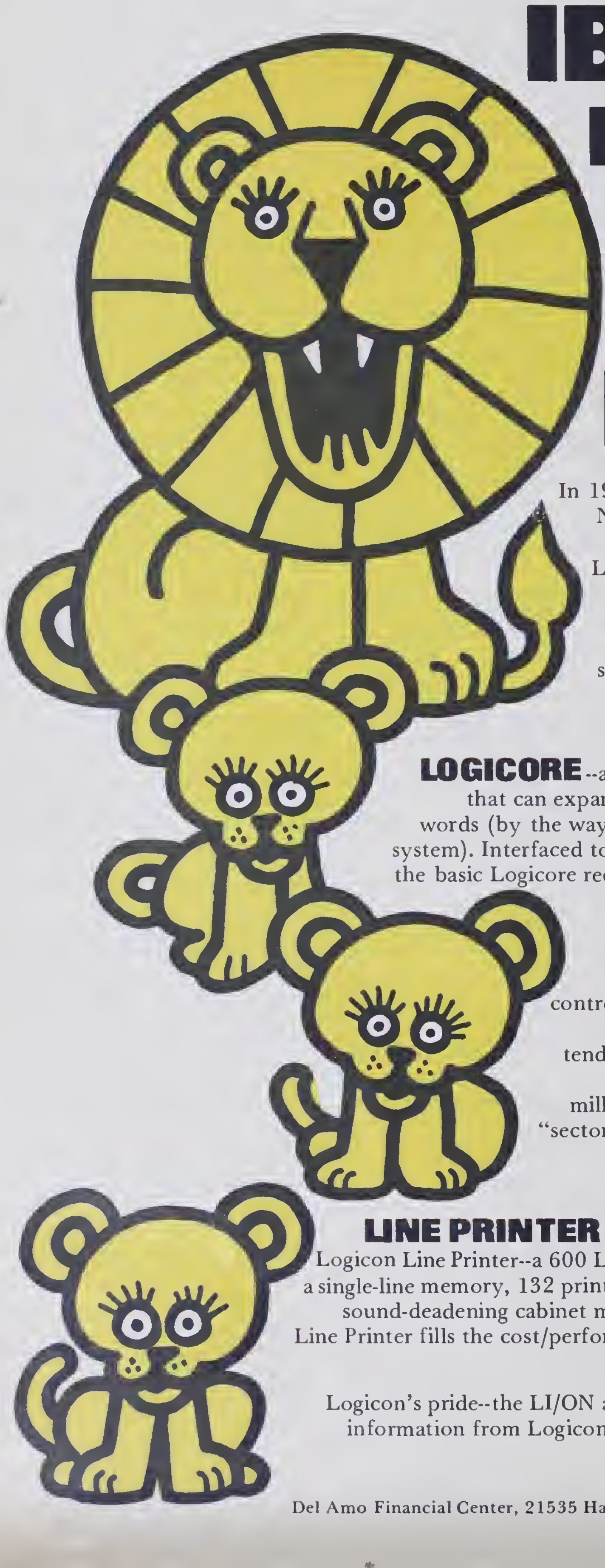
The on-line information exchange capability of the inventory system is broad-based. Inventory control managers can call out a display of the current stock status of a specific product at any of the 35 regional warehouses; the total on-hand quantity of any individual product at all the warehouses; and the current on-hand inventory of all products stocked at a particular center, and the quantity on order from the plant.

Inventory managers can use the terminal to determine which warehouses stock a certain product, and the number of units each one currently has on hand. They can switch from an inquiry to an information entry format, and record the transfer of stock from one branch to another, or add or delete stock from a branch inventory total.

Sales managers can call out a display of information on an individual customer account, showing the customer's dealer classification and total value of purchases. They also can obtain the details of a specific sales transaction, or even a summary of a particular customer invoice.

Every Sun Electric product sold is covered by a firm 12-month warranty. Under the old system, the service department maintained a wall drawer file of thousands of 3 x 5 cards containing detailed warranty information. Every warranty transaction involved a search of this massive card file, and the procedure was often time-consuming and inefficient, from the standpoint of accurately determining the product, purchaser and specific warranty terms involved each time.

Now the pertinent warranty information is instantly available at a visual display terminal, and a determination as to whether an item is in or out of warranty can be made while a customer or salesman waits on the telephone. The information needed can be obtained by entering the serial number.



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**LOGICORE**--an add-on core storage available in 8K modules that can expand the 1130 memory capacity to 65,536 16-bit words (by the way, this is equal to 131,000 bytes on an IBM 360 system). Interfaced to the 1130 system through slip-on connections, the basic Logicore requires no alterations or permanent connections to the circuitry.

**LPS**--Logicon Peripheral System adds a disk controller and 11-platter disk drive to the 1130. LPS options include a second disk drive, a SAC extender and a 600 LPM printer. The system supports two disk drives with a total capacity of 20.48 million 16-bit words. Unique design incorporates a "sector protector" which eliminates the possibility of inadvertent destruction of stored data.

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## Random Notes

### Chicago T/S Vendor Puts 'Advanced ATS' on System

CHICAGO – Subscribers to the Computer Innovations time-sharing service can use the newly installed Advanced ATS software for data entry and file maintenance, as well as the text-editing functions for which it was designed, a spokesman said.

The system is said to provide on-line sorting, search and retrieval logic; data manipulation including field replacement, erasure and duplication; conversational data entry and a range of report generator functions. Neither CPU time nor monthly minimum is charged, the company noted from 70 West Hubbard St., 60610.

### ADR Adds Time-Shared Support For Distributors, Wholesalers

PRINCETON, N.J. – Distributors, wholesalers and manufacturers can put all their business applications from purchasing, disbursement and inventory control through accounts receivable on a time-sharing basis, with the Commercial On-Line Transaction (Colt) system now available through Applied Data Research.

Users in the eastern U.S. can generate at their terminals, all necessary documents, including purchase and production orders, invoices, packing slips, shipping labels and customer invoices each of which can be tailored to the user's needs, ADR said. The company is at the Route 206 Center, 08540.

### Transnet Has Business Services

UNION, N.J. – A general ledger system designed for accountants and accounting firms provides income statements and balance sheets on a time-shared basis, according to the vendor, Transnet Corp. In addition, inventory control and payroll systems are also available, a spokesman said.

Developed originally by Dialcom Inc. of Silver Spring, Md., the services are said to cut processing time by 50% compared to manual or conventional DP methods. Transnet is at 2005 Route 22, 07083.

### Modcomp Minis Get 'Sax' Appeal

FT. LAUDERDALE, Fla. – Users of Modcomp 16-bit minicomputers can schedule and control real-time tasks in a multiprogramming environment with the Special Application Executive (Sax) software recently announced by Modular Computer Systems.

Sax is said to schedule, regulate and provide I/O and operator communications for core resident tasks that acquire data and control processes, in a minimum core and operating overhead. The Sax packages will be ready this fall, the company said from 2709 North Dixie Hwy., 33308.

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## Kolence Tells ABA:

# Simple Definitions Ease Measurement

By Don Leavitt
Of the CW Staff

MIAMI – DP managers concerned about better utilization of equipment have often been unable to calculate the effective capacity of any configuration to do work, but the procedures for such a calculation are almost completely developed and "should become generally available soon," according to Kenneth W. Kolence, a "software engineering" consultant.

Speaking to a recent meeting of the American Bankers Association, Kolence said such a calculation would provide a means of estimating the potential for improved productivity, taking into account hardware and workloads.

Even though the definitive calculation is not yet ready, he added, rough estimates of equipment capacity can be usefully made based on a set of simplistic definitions of DP work and DP power.

The most basic distinction, he said, is between the amount of work required by a given workload and the rate at which a configuration performs that work. The amount of work, in Kolence's view, is a stable number and can be used to characterize the workload and establish trends – it does not depend on configuration characteristics.

"'Rate of work' is called power, and the workload draws power from the configuration," he continued, noting that although power rates are extremely variable, they represent the basic performance of any system.

### Simple Definition

A set of very simple definitions appears to solve many basic performance control problems, Kolence said.

- DP work is the total number of memory accesses used over a period of time.
- The DP work performed by the central processing unit is equal to the number of memory accesses used by instructions.
- The DP work performed by I/O gear is the number of memory accesses used to transmit data from memory to devices or vice versa.

With such definitions, work equivalence between machines can be established. Different types of I/O work can be characterized properly, either in terms of the equipment configuration or the programs, Kolence stated.

Through network calculations or measurements, the effective capacity to do work over time, or create DP power, can be established for any level of the system, he added. These definitions allow the determination of DP power for a channel or the power requirements for a program or mix of programs, he said.

Admitting that his definitions ignore such factors as register changes that occur during execution of instructions, Kolence said that "for practical purposes" memory accesses used are proportional to the total work accomplished by an instruction.

### Satisfy Needs

Beyond that, he said, these simple concepts satisfied the basic needs for workload projection, equipment planning and equipment evaluation.

The tools needed to measure work and power are not completely available, he said, but let users begin without "any special problems."

System Measurement Function (SMF) and manual log data provide information needed to integrate data supplied by system and program monitors. SMF, with modifications, would also be sufficient to generate the "all important categorizations of capacity usage," he said.

Kolence's office is at 3591 Louis Road, Palo Alto, Calif., 94303.

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# Honeywell 'Datanetwork' Service Supports T/S, Remote Batch Jobs

WELLESLEY, Mass. – Users working with, or considering time-sharing services have another alternative supplier with the newly announced Datanetwork service from Honeywell.

Based on a dual-processor Honeywell 635 in Minneapolis, the service provides interactive time-sharing, conversational and conventional remote batch processing through local dial-up in 21 metropolitan areas across the country. The new service complements the time-sharing capabilties already available nationwide from Honeywell's H-1648-based service, a spokesman said.

For those users outside the areas supported with local dial-up, Honeywell has In-Wats service, he added.

The current H-635 configuration, said to be capable of supporting 63 concurrent users working from a broad range of terminal types, is expected to be upgraded to an H-6070 or H-6080 before the end of the year, the company said.

Like many more mature remote communications networks, Honeywell's system provides access to a single data base from a user's scattered locations.

Remote batch processing on the net can be handled on terminals operating at 110 to 130 bit/sec or on satellite computer systems such as H-200, operating at transmission rates of 2,000 to 4,800 bit/sec.

The system supports Fortran, Cobol, Algol, Jovial and an assembly language for remote batch work, and Fortran, Basic, Databasic and an Editor package for time-sharing. Program development tools include symbolic debugging routines, the spokesman said.

A standard "component pricing service" is expected to cover most users, but an express service will provide faster-than-normal turnaround when needed. Under time-sharing, users have bulk-usage rates and dedicated-port rates available, in addition to standard charges.

Datanetwork offices are at 60 Walnut St., 02181.

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# Univac Adds to Series 70 DOS

CINNAMINSON, N.J. – Job scheduling, automatic volume recognition of both tapes and disks and spooling of I/O operations are among the features of Resource Management System (RMS) which has been added to Series 70 Disk Operating System by Univac with the recent release of DOS 14.1

RMS can be used with the Series 70 CPUs with a minimum of 132K bytes of real memory. The new management system is said to support as many as 14 concurrent job streams with dynamic allocation of memory and other resources.

One of the RMS features also dynamically adjusts internal processing priority of user jobs based on the amount of I/O time vs. CPU time a job uses, as measured by the system. This optional feature will keep I/O-bound jobs at the top of the processing scheme and process-bound ones at the bottom, Univac said.

Improved scheduling of user jobs is also supported by the spooling routines, called Spool 1, which emulate card readers, punches and printers so that I/O can be processed to and from high-speed random access work files rather than the slower physical devices.

The spool file space is also controlled dynamically by RMS, used by the application program as needed, and returned to system control when depleted of its data.

The Automatic volume recognition (AVR) feature, similar to one available under IBM's OS/360, can determine that the appropriate tape or disk volumes are available "somewhere" before a job is executed. AVR allows files to be mounted on any tape or disk device available and should ease the operator's function and the potential for error.

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# The Mighty Mini

## What is it?

When does a large calculator become a minicomputer? And when does a mini become a "general purpose" computer? We'll try to define the mini, and we'll discuss some of the pros and cons of word lengths, byte-oriented machines, micro-programming, core and solid state memories.

## What can it do in communications?

The Mini can take a great deal of the load off the main processing system, and we'll look at a sampling of dedicated communication applications. We'll also examine the use of minis at remote sites – and the cost changes that can result.

## What can it do in business?

We'll look at what appear to be the best uses of the Mini in business applications. We'll review peripherals available to the business user and take a look at business-oriented software.

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Minis are the greatest industrial tool since humans. They have all the advantages of a machine, with many of the capabilities of a brain. They can do hundreds of jobs that would be impossible for humans, and they make many other jobs economically feasible for the first time. They can't do everything, of course, but their impact on industry can hardly be underestimated. We'll speculate on the mini's industrial future, look at specialized equipment for industrial use, and provide an introduction to the makers of process control equipment.

Computerworld's August 30th Minicomputer Supplement will cover the field – and it will be read by people who use the Mini:

61% of the respondents to a recent Computerworld subscriber survey said their companies currently buy and use minis. Of the remainder, 57% said their companies will be buying minis within a year.

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# 'Fas/Test' Lists Files, Dumps, Reports as Part of Test Output

BURLINGTON, Mass. – Application program test sessions under DOS/360 may be easier to control and evaluate with the Fas/Test software package from Synergetics Corp. Controlled by parameter cards, it requires the user to plan ahead rather than just start the test "to see what will happen."

In operation, Fas/Test adds only 3K bytes to the partition size required by the program under test. It slows the test session processing somewhat, by printing files, core dumps and reports as the session is under way, rather than through utility programs at the end of the session.

### Positive Tracing

But by printing all the files, record-by-record, in the sequence they are processed by the program, Fas/Test provides a positive method of tracing complex program logic, a spokesman said.

The package also intercepts data exceptions before they can cancel execution of the program being tested. Thus an essentially insignificant error that left a numeric field blank or unsigned, for example, would not in itself force a recompilation of the program before testing could continue.

Since the Synergetics package operates with the user's object code, it can be used with programs originally written in Cobol, BAL or RPG, the spokesman said. It supports card, tape or direct access (disk or drum) files, he added.

### Tailored Output

The Fas/Test control cards allow the user to tailor his output so that, for example, it will only print what he considers critical areas in a file. This feature can also be used to retrieve data from any file, allowing immediate confirmation of matching or conflicting control fields from file to file, the company said.

The package is currently available for a one-time charge of $1,750 or on a leased plan for $75/mo.

Synergetics Corp. is at One Garfield Circle, 01803.

# Letters Tailored Using 24K 360/22

COLORADO SPRINGS, Colo. – Users with a Univac 9200 or 9300 or a 24K IBM 360/22 or larger CPU, and upper/lower case print capability, can generate personalized letters, with text as well as addresses modified, with the Computerized Mailing System (CMS) available now as a package or a service from Mountain States Computer Corp.

### Minimum Hardware Requirements

To operate with minimum hardware requirements, CMS can work with only one basic letter at a time, in contrast to some more complex systems that allow a choice of text based, perhaps, on a key identifier in the user file.

CMS can use two- to five-line addresses, with salutation and name inserts in the letter body controlled by the program. There are no problems with divided last names, or with a lower-case character beginning a name, the company said.

Paragraphs are reformatted and, if necessary, rehyphenated following an insertion of a name or other data item extracted from the user file, so that there is no obvious fixed-length "hole" for the inserts.

The service is priced from 10 to 25 cents a letter. The package costs $8,500, and can be ordered from 1120 North Circle Drive, 80909.

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# Package Eases Tape Handling Under DOS/360

BURLINGAME, Calif. – DOS/360 users may be able to reduce the number of tape units in their installations, as well as eliminate errors caused by using improper tapes and simplify tape operations, with the Epat data set catalog system program from Software Design Inc. (SDI.)

Epat provides automatic volume recognition for tapes so the DOS user is no longer required to mount a tape on a specific unit. The tape may be mounted on any tape unit available.

### Overcome Problem

This software thus appears to overcome the DOS operator's problem of being unable to mount a tape for the next job (because its Assigned unit is in use), even though there are available units.

The freedom Epat provides is said to have enabled one user to eliminate one of the six tape units he had been using.

The key to Epat is a small, resident catalog of every physical tape volume in an installation. This catalog is accessed whenever a tape file is OPENed to determine the volume serial number of the most current generation of the required data set.

### Scan Tape

Epat will scan all the tape drives for the desired volume. If the required tape is not available, a MOUNT message is issued to the operator.

The Epat catalog is said to be self-updating as volumes move through a cycle of becoming data sets, being recognized as retained data sets and, finally, being released as "scratch" tapes.

Epat costs $180/mo from SDI at 873 Hinckley Road, 94010.

# SPSS Versions Suited To Various CPUs: Norc

CHICAGO – The Statistical Package for the Social Sciences (SPSS) is now available from the National Opinion Research Center (Norc) for various CPUs, including IBM 360, CDC 6000 and 3300, Univac 1108 and Series 70, Decsystem-10, Burroughs 6700 and Xerox Sigma series machines.

Versions for CDC 3600, Burroughs 5500 and Honeywell CPUs are under development, a Norc spokesman said from 6030 S. Ellis, 60637.

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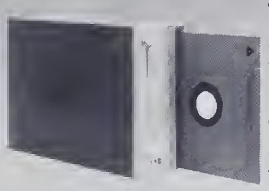

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# Data Briefs

## Periphonics Has Modem For Voice Answer Systems

BOHEMIA, N.Y. – A Bell-compatible data set for audio-response systems is available from Periphonics Corp.

The DMC/403 is equivalent to Bell 403 data sets and can accept multifrequency tones generated by Bell Touch-Tone phones or terminals which transmit two-out-of-eight types of codes.

The DMC/403 is mounted on a single card and costs $710. A DSU 400 cabinet with power supply that can hold up to 12 data sets costs $1,025. A complete system of 12 modems is priced at $9,500 or about $305/mo on a three-year lease. Comparable Bell modems would cost about $600/mo, a Periphonics spokesman estimated.

## Unit Detects Data Errors

PROVIDENCE, R.I. – International Data Sciences Inc. has an error-detection and correction device that is said to spot 99% of all data errors.

The Validata 9100 is designed for operation between the user's terminal and modem on 4-wire channels or 2-wire links with reverse channel capability, a spokesman said. It can operate at speeds up to 9,600 bit/sec.

The 9100 includes an "encoder" that adds an error-detecting code to the data and a "decoder" at the other end of the channel, the company said. When errors are detected, the Validata unit corrects the condition via a request/query process and retransmission, a spokesman said.

The 9100 is described as transparent to the user's CPU, terminals and modems. Maintenance is provided on a unit replacement basis, a spokesman said. The device costs $1,495 and is available in 30 days. The company is at 100 Nashua St., 02904.

## MSI Has 2710 Controller

COSTA MESA, Calif. – MSI Data Corp. has introduced a controller for users of its MSI 100 and Source 2000 terminals.

Called the 2710, the unit is a replacement for the IBM 2701 and can save MSI users about 70% compared to the IBM system, a company spokesman said.

The 2710 operates with bit synchronous Manchester code and uses an MSI-developed access method which takes less core than Btam, a spokesman said. The 2710 can operate with Bell 202C modems or equivalent independent equipment.

The controller costs $4,500 with interface, auto dialer and one control line. Additional control lines are $1,500. The firm is at 1381 Fisher Ave., 92627.

## Controller Drives TV Sets

ANN ARBOR, Mich. – The Ann Arbor Terminals Model Inc. 208 video controller offers a full 80 x 24 alphanumeric display capability with a 64-character Ascii repertoire, plus built-in buffer and refresh memories.

The Model 208 provides soundless operation at asynchronous data rates to 1,200 char./sec. The 208 is designed for applications such as: I/O peripheral control/readout; on-line data entry/retrieval; reservation system control; insurance or account information handling and computerized education.

Capable of driving multiple displays (either conventional TV sets or 525-line video monitors), the Model 208 is available in both serial and parallel RO33- or KSR33-equivalent interfaces with RS232, TTL or current-loop compatibility.

Delivered plug-compatible with the user's equipment, the Model 208 costs $1,075. Delivery is 15 days.

The firm is at 6107 Jackson Road, 48103.

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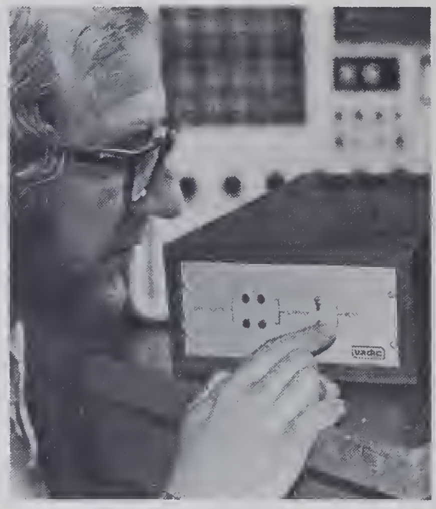
### Different Frequencies

# Modem Handles European Data Signals

By Ronald A. Frank
Of the CW Staff

SAN FRANCISCO – A 360/67 transmitted a message to a remote IBM 2741 terminal recently and the data was received nine hours later. But the results are not as bad as they sound because the CPU was in San Francisco while the on-line terminal was in Brussels, Belgium.

In connecting a terminal in Europe with a CPU on the West Coast, Standard Oil of California had some unique problems. On the Belgian terminal end, an IBM World Trade 3976 modem operating at 134.5 bit/sec was installed. An equivalent modem with the same characteristics was not available from IBM in this country. The 3976 modem operates with the CCITT (Consultative Committee on International Telegraphy and Telephony) mark and space frequencies which are different than Bell frequencies used in the U.S.



Les Baker checks special modem on European data link.

### Frequency Sets

When a modem is in the originate mode, it uses one set of space and mark frequency and when in the answer mode it uses another set, according to Les Baker, communication engineer in the telecommunications department at Standard Oil. The CCITT frequencies used throughout Europe are really "more in the middle of the voice-grade band range than Bell frequencies," Baker said.

The CCITT originate frequencies are 980 Hz mark and 1180 Hz space while Bell uses 1270 Hz mark and 1070 Hz space. The CCITT answer frequencies are 1650 Hz mark and 1850 Hz space while Bell uses 2225 mark and 2025 Hz space, Baker said.

Because of the frequency incompatibilities, it was decided that one of the locations would have to operate according to the standards used at the other. Since the Belgian 2741 was also used by the Standard Oil refinery in Brussels to access the IBM time-sharimg service in London, it was not possible to modify the European end of the link.

The CCITT signals were thus brought into San Francisco. This meant the installation of a CCITT (Bell-incompatible) modem on the West Coast. The CCITT signals also had to be transmitted over AT&T Long Lines and Pacific Telephone & Telegraph local lines supplied to Standard Oil by ITT.

The user purchased the required modem from Vadic Corp. and the unit was installed, with the usual Bell CRT DAA. The modem was attached to an IBM 2703 controller which in turn connected to the Model 67.

"One of the first problems was finding a common frequency to disable the echo suppressors," Baker said. "We selected 2100 Hz which was a CCITT spec and also fell within Bell's acceptable range."

Although the specs called for a tone about 400 msec long, this was increased to two full seconds. The longer tone was necessary because part of the transmission link included an Intelsat satellite channel which added an additional delay to the circuit, Baker said.

### Immediate Shift

After generating the echo suppression disable tone, the Vadic modem immediately shifts to 1650 Hz which is the CCITT answer mark frequency. When hearing this frequency shift, the Brussels operator pushes the data button on the World Trade 3976 modem which in turn generates a 980 Hz originate mark frequency.

The Vadic modem then tells the Model 67 it has carrier detect and a clear to send, and the National CSS operating system, resident on the Model 67, transmits "CSS on-line" to the 2741 in Brussels.

But the on-line message was not being printed on the terminal in Brussels because a built-in delay in the World Trade modem failed to unlock the keyboard fast enough. So a delay was introduced into the Vadic modem that held up the clear-to-send signal. Again it was decided not to modify the 2741 because it was also using the time-sharing facilities in London.

### Replacement Problems

With the link up and running, one further problem developed when the 2703 IBM controller was replaced with a Memorex 1270. Because of different line control characteristics which included automatic speed selection, the 1270 "lost" the automatic speed character generated by the 2741.

In this case, rather than change the timing intervals, it was found that the 2741 operator could "simulate" the lost character by waiting about a second after going to data mode and then manually depressing the number sign on the keyboard.

Although some operating problems had to be overcome, the transmission of the CCITT signals on Bell lines posed no problem, Baker said. Standard Oil gets the entire link from ITT, normally an overseas carrier. ITT in turn gets the necessary domestic lines from the Bell System.

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# Texas College Connects 360/50 With CRT Terminals in Spain

HOUSTON – A 50,000-mile data communications link using the Atlantic Intelsat IV satellite was used by the Baylor College of Medicine early this month to demonstrate the uses of computer/communications in medicine.

The college's 360/50 received inquiries from six IBM 2260 CRTs installed with a 2848 controller at the Palacio del Nationes in Barcelona, Spain.

### 2,400 Bit/Sec

During the four-day demonstration, medical data was transmitted at 2,400 bit/sec using International Communications Corp. 2200/24 modems over a data circuit supplied with the cooperation of Southwestern Bell, AT&T, Western Union International and the National Telephone Co. of Spain.

The Model 50 at Baylor is equipped with a 2701 with a type III terminal adapter. Diagnostics, line balance and other coordination took several days and were accomplished via dial-up lines between Houston and Barcelona, according to Dr. Allan H. Levy, director of computer sciences at the college of medicine.

### EKG Data

In one test, electrocardiograph information on a volunteer subject in Spain was transmitted to the Model 50 in Houston. Based on this data, the CPU calculated the maximum working capacity of the "patient" and transmitted its evaluations back to Spain.

In other tests, information on a patient's medical condition was transmitted via the satellite link, and the Model 50 "prescribed" a health care plan; and computer-assisted medical instruction was demonstrated with responses to technical questions sent back to Spain and displayed on a 2260.

The Baylor DP center has 128K bytes of native core, a 1M byte Ampex extended core memory box, Ampex double density disk drives and IBM magnetic tape units, a college spokesman said.

The test transmissions were held during the Sixth International Congress of Physical Medicine in Barcelona.

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# Modem Operates at Three Speeds

CANOGA PARK, Calif. – American Data Systems has introduced a new digital data modem which converts from 1,200 asynchronous to either 2,400 or 3,600 bit/sec synchronous mode operation. Conversion from the basic 1,200 bit/sec unit is accomplished by the addition of plug-in printed circuit cards, which the user can easily do at the installation site of the modem, ADS said.

The modem, the ADS-412/424/436 operates in a frequency-shift-key mode at 1,200 bit/sec and in a phase-shift-keyed mode at the 2,400 and 3,600 bit/sec speeds.

### Many Applications

The company said the modem can operate in a wide variety of applications, on dial-up and private lines, including polled operation, reverse channel and "ack-nack" systems.

The 1,200 and 2,400 bit/sec models are compatible with EIA, CCITT, Bell 202 data sets (ADS-412) and Bell 201B data sets (ADS-424), the firm said.

The company said the ADS-412/424/436 is the first modem to offer digital integration of both transmitter and receiver. The net result is the elimination of periodic maintenance or adjustment of the unit, ADS said.

### Visual Diagnostics

The modem includes visual diagnostics of line condition and system status provided by light-emitting diodes.

Options include secondary data channels, remote loopback control, automatic equalization (standard on ADS-436), dial-up back up and auto answer.

The modem can be expanded in stages by the user. The basic unit with 1,200 bit/sec capability costs $580. A card for 2,400 bit/sec can be added for $370, and another card for 3,600 bit/sec costs $650, a spokesman said.

The complete system costs $1,600. ADS is at 8851 Mason Ave., 91306.

## Bits and Pieces

### Enhanced CMC Key System Offered in England First

LOS ANGELES – Computer Machinery Corp.'s latest version of the CMC Keyprocessing Systems, the CMC 10, will be available for English users during the fourth quarter of 1972.

The new system, which will be available in the U.S. at a later date, differs primarily from the CMC 9 system in its ability to handle variable-length fields and records, allowing it to replace punched paper tape systems more easily, the company said.

The CMC 10 is priced at $3,750/mo. CMC is at 2231 Barrington Ave., 90064.

### Portable Punch Weighs 1 lb.

TARZANA, Calif. – Data Devices, Inc. has developed a portable card punch that weighs less than 1 lb. and can handle standard 40- and 80-column cards.

The manually operated Dynapunch 200 uses a stylus to enter data onto the card. It sells for $50 with quantity discounts available.

### Globe Ticket Offers S/3 Packs

PHILADELPHIA –Disk cartridges for the IBM S/3 5440 disk drive are designed to meet or exceed industry specifications, according to Globe Ticket Co., the manufacturer.

The cartridges are priced at $150 and available on one-week delivery through P.O. Box P, 19105.

### Smaller Pieces

The Michael Roving Paper Rack from Michael Business Machines Corp., New York, will handle 36,000 8-1/2-in. by 11-in. sheets, 50,000 envelopes or 80,000 punch cards.

– – –

Varisystems Corp., Plainview, N.Y., is providing field service on all major phototypesetting equipment in New York, Chicago, Los Angeles, Atlanta and Boston. Service in Dallas, Kansas City, Minneapolis, Pittsburgh, Detroit and Denver will be started soon.

– – –

Wilson Jones Co., Chicago, has introduced the Mini-Racks for printout binder storage which can be combined into systems of almost any size or shape, the company said.

– – –

Four Soundoff Dampeners from Van San Corp., Los Angeles, are designed to fit all models of Anderson Jacobson, Novar and Redactron terminals and reduce terminal noises to office levels.

– – –

Electronic sensors are used to screen intruders for mangnetic objects in a system from Cattaro Scientific Control Co., Chantilly, Va.

– – –

Rose-Wood Microfilm Storage Carrousels are available from Vegas Provincia, Inc., No. Hollywood, Calif.

# Good Records Aid System Performance

By Frank Piasta
Of the CW Staff

The most important aid in maintaining a computer system's performance, according to users recently surveyed, is an accurate and complete record of equipment performance.

Using these records, the user can provide authentic data on his system failures to the engineers servicing the equipment. He can even use them to prove his case for extended preventive maintenance (PM), the survey showed.

Many large installations carry the record keeping to the point where a daily report on all machine "downtime" is prepared, whether caused by hardware or software failure or other factors. These reports are then distributed to the personnel involved.

Although the records can be used to increase the amount of PM allotted to the installation, the users also felt the maintenance can be performed at minimal disruption to normal operation.

Cases were cited by the users of engineers wanting to take over the entire system, for example, to check out a piece of peripheral gear, such as printer or tape drive.

The more experienced users including Nick Kanakis of General Instruments, were able to get the engineers to do the bulk of the testing off-line while the system continued processing jobs that did not use the components in question.

Some users also employ a "rule of thumb" to decide when the equipment should be taken out of service. James Miller of Black & Decker gave the danger point as 20 read/write error/reel on a magnetic tape drive.

Larry Flynn of Hearst Publishing decided that a disk drive that has racked up a total of four seek errors in an eight-hour shift is too unreliable.

Users also seem to agree that a tape drive that breaks a tape during rewind should be taken off line immediately.

### Printers Rate High

Printers in general and the IBM 1403 in particular get very high marks for their lack of problems, and the minimal care they require. Flynn uses his printers for OCR and thus has very strict quality control requirements for the printing.

He admitted the printer had to be very carefully adjusted and printer ribbons replaced strictly on schedule to maintain the quality required. He still considered the printer "extremely reliable."

# Ampex Replaces Univac Storage

MARINA DEL REY, Calif. – Ampex has combined its 2314-equivalent DM314 disk drive with a radial controller to produce a new random access system for Univac computers.

The drive had previously been offered with a serial controller as a substitute for Univac Fastrand drums. With the Radial Array controller, the DS-8430 system can also replace the Univac 8414, 8440 and 8460 disk drives.

The Ampex disk system is designed to operate with Fastrand software on both the Univac 400 and 1100 series computers. It is said to offer a higher level of performance and lower cost (20%, on average) than the Univac devices.

Each drive in the DS-8430 can store up to 9M 36-bit words. Average access time is 32 msec and average transfer rate is 5 mbit/sec, Ampex said.

The Radial Array controller comes in single and dual-channel configurations, with each channel able to accommodate up to 16 disk drives.

Unlike the previous serial controller that used "daisy-chaining" to connect the drives, the radial controller makes seek as well as read/write overlap possible. It provides an independent path to each spindle from the controller resulting in higher throughput and an effective 20% to 25% increase in disk capacity, an Ampex spokesman said.

Total system capacity is greater than 300M 36-bit words, the firm said. The controller sets different "lacing" parameters for each drive in the system. Also included are more sophisticated off-line diagnostic testing capabilities, Ampex added.

A typical Ampex DS-8430 system with four drives may be leased for less than $3,700/mo on a one-year contract, Ampex said, including prime shift maintenance.

Univac systems with equal capacities would range from about $6,000/mo for the 8414 disk drive to about $12,000/mo for the Fastrand drum. Average access time on the Univac units ranges from 55 to 92 msec.

The Ampex DS-8430 is available on a 60-day delivery schedule from 13031 W. Jefferson Blvd., 90291.

# Key System Suits Small Users

FAIRFAX, Va. – A shared-processor data entry system for users with lower requirements than those available with its current units has been developed by C3, Inc.

The AU 150 differs from the older AU 100 in incorporating a moving head disk drive which provides from 2.5M to 10M bytes of intermediate storage. The AU 100 uses a fixed-head disk primarily as a buffer.

The incorporation of the new disk enables the AU 150 system to process its "end-of-day" data dumping procedures in about 1/10th the time of the older system, the company said.

The basic system includes a Data General Nova 1200 minicomputer, expandable from 16K to 32K in 4K increments; 556 or 800 bit/in. 7- or 9-track tape drive; 2.5M-byte disk, and eight terminals that can be used for both data entry and verification.

The basic system costs $1,400/mo on a one-year lease or $60,000 on a purchase basis. It includes the basic terminal operation and job statistics software and can handle up to 48 field per format. Record length is limited to 80 characters.

The system can be expanded to 20 stations at $75/mo each. Other options include higher mainframe and disk capacities, 1,600 bit/in. tape and several software packages.

The packages include the Programmed Output Feature that can handle multiple output formats of the same data as well as data on tapes generated on "foreign" systems. The feature provides logical arithmetic functions and conditional processing in addition to field rearrangement.

Other features provide batch balance, check digit handling and the ability to handle record lengths of up to 1,000 characters. A more sophisticated operator and job statistics package is also available.

A standard feature on all systems is the ability to perform simultaneous housekeeping and data entry.

# IBM Okays Add-Ons

MARINA DEL REY, Calif. – Three add-on memory manufacturers have been told by IBM that computer systems equipped with their memories are eligible for "standard" maintenance rather than "best efforts" service.

Ampex disclosed its installation, increasing an IBM 360/30 to 96K, had been checked by IBM. The mainframe maker said installations that were the same as the one inspected would be suitable for normal maintenance, according to an Ampex spokesman.

Approval for standard maintenance was also given by IBM to two oversize Computer Investors Group 360/50 installations. One of the systems was a 512K to 768K upgrade, while the other was a 256K to 768K step-up.

A 370/155 with 1M bytes of memory from Itel has also been checked out by IBM and found eligible for standard maintenance, Itel said.

Both Ampex and CIG have had 370/155 installations checked by the mainframe maker, and are awaiting the IBM decision.

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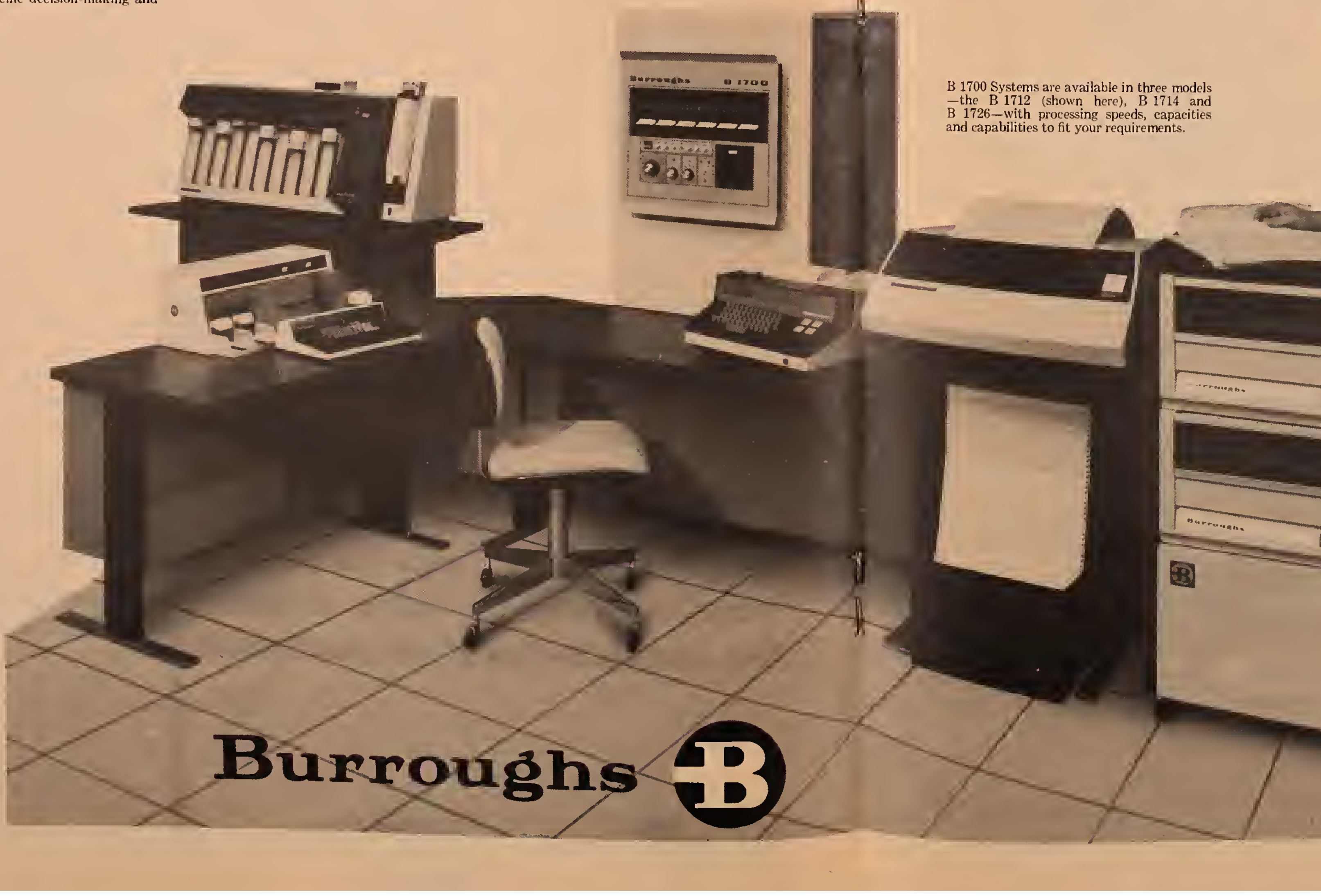

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# Varied Reports Allow Tight Control of Firm's Growth

Special to Computerworld

OLD HICKORY, Tenn. – Account and dividend activity (more than $1 million paid to members last year) has greatly increased paperwork and administrative burdens at Old Hickory Employees Credit Union and challenged credit union management to handle the volume of transactions and loans outstanding – particularly delinquent ones.

While payroll transactions are handled automatically by the system, some 3,500 non-payroll transactions a month are keypunched and entered into the computer on punched cards.

The dual objective was to hold the line on administrative costs in order to maintain the maximum dividend rate, and to provide operating reports which could give management a better "handle" on credit union activities.

Efficiency was becoming an increasingly difficult problem, since an existing ledger card system for posting accounts was running up to three weeks late.

After a lengthy study, management elected to install an IBM System 3. Equipped with two magnetic disk storage units, the computer permits fast and accurate posting of accounts and produces special reports for credit union management, pinpointing areas which need attention.

The delinquent loan report can now be produced on demand, and a series of other reports and analyses are also available. Operations generally have been speeded, and both accuracy and control have improved, according to E. Odell Smith, manager of the credit union.

"With all our loan, share and transaction information stored on accessible high-speed disks, there is virtually no limit on the variety of special reports we can get on request," Smith said.

Smith uses the computer for a sophisticated "what if" analysis of dividends.

*Small Systems User*

Each month, he feeds into the system a dividend rate and, in effect, asks the system how much Old Hickory would pay out in dividends at that point in time.

The computer not only provides an answer at the indicated rate, but also for the next two interest rate steps above and below – thus it prints a summary report of total dividends that would be paid at five different interest rates.

Posting is now completely current, and payroll transactions are automatically generated. The nearly 3,500 non-payroll transactions a month are keypunched in less than two hours a day, and entered into the system to update data stored on the disks, which is subsequently available for a wide range of reports.

"Volume and activity at this level require timely and accurate information if we are to continue to operate efficiently," Smith explained. "When Old Hickory was smaller, credit union employees could keep many of the details in their heads."

The system produces a summary report showing the number and dollar value of delinquent loans by each of six loan types. A loan summary and analysis, also by type, lists delinquent payments due, non-delinquent payments due, total payments due and new loans.

In addition, the computer prints delinquent notices for borrowers, listing each of the member's delinquent loans and the amount that should be paid, plus a message which varies with the first, second and third notice.

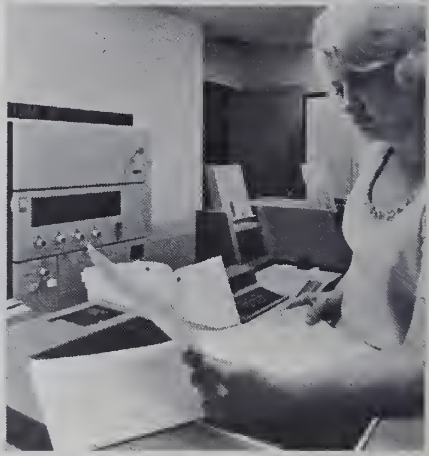
Other key reports generated include the following:

- Weekly transaction histories show the status of each share and loan account for every member, along with the full week's transactions.
- A monthly share account summary denotes the number of members in each of several categories by the size of account.

The computer soon will produce a quarterly statement for each credit union member, in place of the present annual statement. This will show, for each loan the member has, the loan number, payment, interest rate, balance due, a quarterly summary of the payments on loans and deposits to his share account.

### Three Main Files

The various reports are produced from three main files stored on the disks, each disk having a capacity for approximately 2.5M characters of information.



Special management reports are generated on request by the computer. The computer operator reviews an analysis she has produced for the credit union manager.

One of the disks contains a complete transaction history file, which is used to produce the weekly listings and other documents.

Old Hickory is also converting to a new filing system that requires 6,000 pressure-sensitive labels for color-coded file folders. Each label has to be typed with two lines – the member's name and Social Security number – this represented a monumental typing assignment.

A computer operator who had just learned programming spent a day writing, compiling and debugging the program. The computer then printed the labels in less than two-and-a-half hours.

Future plans for Old Hickory's system include automating the general ledger accounting, calculating insurance premiums for both savings and loan insurance, and improving member service by utilizing more fully the growth capabilities of the equipment.

"Ultimately, we hope to calculate the credit union's profit or loss on each type of loan and alter interest accordingly," Smith said.

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# Aussie Model Simulates Grazing Of Summer Pasture by Sheep

By William Scholes

Special to Computerworld

SYDNEY, Australia – Scientists in Canberra, Perth, Armidale, New South Wales and Canterbury, New Zealand, have constructed mathematical models of grazing systems so they can now look at specific problems.

Although engineers and physicists have for sometime been building mathematical models of complex systems, in agricultural science the technique has only just emerged from the pioneering stage.

Part of the reason, according to researchers of the Australian Commonwealth Scientific and Industrial Research Organization, arises from the complexity of biological systems.

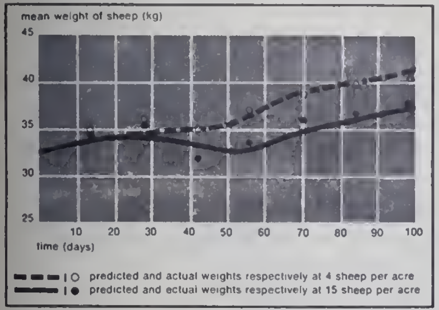
This complexity and the lack of fundamental data initially deterred agricultural scientists from attempting to construct models of animal and plant systems. But now they have adopted the technique and biological models are growing rapidly.

Agricultural scientists are plagued by that bane of biological sciences, extrapolation – from small experiments at few laboratories, over short periods of time, to the broad "acres" of agricultural science. Instead of bemoaning the lack of data, they must use available information, often not very much to define "a model" of the real-life problem they face. In their case, the model consists of a series of mathematical equations describing the underlying processes involved.

The next step, using the computer, is to test the theoretical model against actual practice – checking its predictions against field results. Scientists thus build their model by trial and error, doing further field experiments when additional information is needed to refine it – but only when the model proves inadequate.

### Summer Grazing

In the Division of Plant Industry in Canberra, alternative farm strategies were first compared in a computer study by Dr. F.H.W. Morley. He calculated the probable effects of rotational grazing procedures on pasture production and examined the effect of management on animal production.



**The sheep weights predicted by the model for a 100-day period in summer were followed closely by actual weights recorded in a field experiment.**

The first grazing model was set up by Dr. J.L. Davidson, Dr. M. Freer, J.S. Armstrong and J.R. Donnelly three years ago.

This first effort, a summer grazing model, was described at the International Grassland Congress in Australia in 1970. Its aim is to simulate pasture growth and weight gain in wethers over a 100-day period in summer.

By limiting the extent of their proposed simulation, members of the research team were able to make rapid progress in what was originally a training exercise within the division.

Two inputs "drive" the model (see diagram), rainfall and evaporation, which are used to calculate the soil moisture, which is in turn linked to production of green feed.

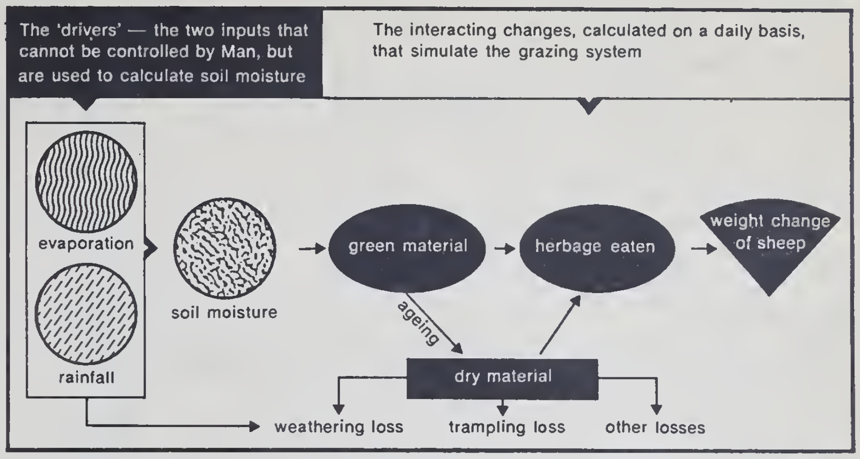
Other equations represent conversion of green to dry feed; loss of dry feed from weathering, trampling and time; composition of the sheep's diet as determined by the amount, quality and ratios of green and dry feed; the effect of grazing itself on that composition; and gain or loss of weight as determined by that diet.

The scientists developed some of the equations from numerous pasture and grazing trials in Canberra. Others were based on whatever information was available, much of it from scientific literature.

Using these equations they programmed the computer to simulate the changes in pasture and animals by repeatedly drawing up daily "balance sheets" of feed available and animal weights.

### Adjustments

Starting with the initial pasture and animal states, the computer adjusts these according to its calculations of animal weight gain and the growth, loss and consumption of herbage for the following 24 hours.


The 'drivers' — the two inputs that cannot be controlled by Man, but are used to calculate soil moisture
The interacting changes, calculated on a daily basis, that simulate the grazing system
evaporation
rainfall
soil moisture
green material
herbage eaten
weight change of sheep
ageing
dry material
weathering loss
trampling loss
other losses

**This diagram shows the components of the first mathematical model built at Canberra to simulate the grazing of summer pasture by sheep. It calculates daily changes in the amount and digestibility of the food available and the diet eaten, and the resulting changes in the weight of the sheep. A more ambitious model is now being attempted to predict year-round meat production from both cattle and sheep.**

It then carries forward the new balances for the "next" daily adjustment. It repeats this once for every day in the period of simulation.

Having built a first tentative model, the team passed to the next stage – a continuous one of testing and validating predictions against what actually happens in practice.

As the graph shows, the first results were most encouraging in that the weight gain and pasture growth predicted by the model closely followed actual performance.

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## Norms, Standards Mexico Topics

MEXICO CITY – "Norms and Standards for Data Processing" will be the topic of a Congress presented in conjunction with the Second International Computer Exposition for Latin America which is being held here July 24-28 at the Maria Isabel-Sheraton Hotel.

The Congress, presented by the Sociedad Mexicana de Computacion Electronica, A.C., will meet July 25-27.

Among the exposition exhibitors will be Digital Equipment Corp., IBM de Mexico, Burroughs, Phillips Corp., Mohawk Data Systems, Hewlett Packard de Mexico, Data General and Nashua.

The Sociedad Mexicana de Computacion Electronica, A.C. is at Yacatas No. 435, Z.P. 12, Mexico, D.F.

### In New Orleans Aug. 2-5

# Education, Privacy Head Nasis Meeting

## Societies/ User Groups

NEW ORLEANS – The National Association for State Information Systems 1972 annual meeting will feature discussions on topics ranging from educational computing to state and federal relationships, right to privacy and management information systems for the courts.

The meeting will be held at the Monteleone Hotel here August 2-5. Jerris Leonard, director of the Law Enforcement Assistance Administration, will address the conference luncheon on Thursday.

The session on computer networks and educational computing – public, private, community colleges and universities, with moderator John L. Gentile of the Illinois Department of Finance – will consider cost of shared vs. stand-alone systems, faculty acceptance or rejection, and problems with communications.

The impact of information systems on the quality of primary and secondary education, moderated by Arizona Sen. David B. Kret (R-Scottsdale), will review the Total Information Educational System.

### Joint Workshop

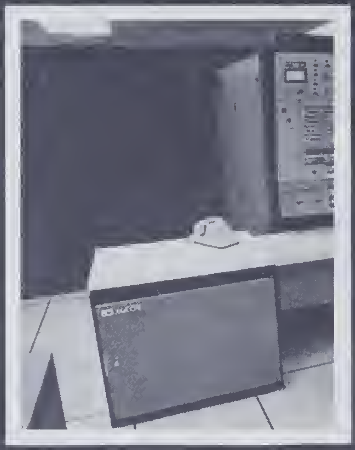
In a joint workshop with the National Legislative Conference, the right to privacy vs. the need for information will be considered. Panelists include Larry Baskir, legislative counsel to Sen. Sam J. Ervin (D-N.C.), John Shattuck, staff attorney for the American Civil Liberties Union, New York, and Daniel B. Magraw, assistant commissioner for Minnesota's Department of Administration.

Federal, state and local relations is the subject of a session chaired by Rex Stallings, director of office information systems, office of the governor, Texas. Two representatives of the Office of Management and Budget (OMB), Frank Carlucci and Walter Haase, along with John Crutcher from the Office of Economic Opportunity are panelists.

Transferability of major federal-state-local systems will include discussions of Health Education and Welfare's Medicaid Information System by Wesley Amend and an update on the Usac Project by Robert Knisely.

Centralization vs. decentralization of state management of information systems and facilities including the role of the central agency, the impact of the minicomputer, remote job entry, dedicated vs. shared facilities and teleprocessing will be considered by panelists Dan Magraw of Minnesota and Dr. Dixon Doll, Eastern Michigan University, with Glenn Goodman of Michigan as moderator.

The registration fee is $30. For further information contact: Sandy Stratton, Nasis Secretary, The Council of State Governments, Iron Works Pike, Lexington, Ky. 40505.



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## Personnel Changes Abound at DPMA

PARK RIDGE, Ill. – Personnel changes abound at the Data Processing Management Association (DPMA), as a result of a reorganization and election of new officers.

The number of international vice-presidents has been reduced from seven to four, DPMA said, and they were made members of a new executive council. Division vice-presidents, now "regional" vice-presidents, are also members of the new council, along with three international officers.

With announcement of the reorganization of DPMA, headquartered here, R. Calvin Elliott resigned as executive director, a post which lost much of its authority with abolishment of the executive board of directors [CW, July 5].

The four international vice-presidents were named at the recent DPMA conference in New York. Two of the four were reelected, Edward Palmer and Eric Ustad. The two new international vice-presidents elected are Donald F. Jervis of Canadian Canners, and Merton Walker of State Farm Fire and Casualty.

The new president of DPMA is former vice-president Herbert B. Safford, project control coordinator for GTE Data Services, Inc., Marina Del Rey, Calif. He succeeds Edward O. Lineback of Boeing Computer Services.

Executive vice-president is James B. Sutton of the Birmingham National Bank in Alabama, and Walter A. Johnson of Consolidated Papers, Inc., Wisconsin Rapids, Wis., is secretary-treasurer.

## Calendar

Aug. 7-11, Toronto – Anniversary Meeting of Share. Contact: Jeanne Johnson, Administrative Secretary, Share Inc., Suite 750, 25 Broadway, New York, N.Y. 10004.

Aug. 14-16, Boston – ACM 72. Contact: Richard N. Waterhouse, Public Relations Chairman, ACM 72, Computer Systems Engineering, Treble Cove Industrial Park, N. Billerica, Mass. 01862.

Aug. 21-23, Vail, Colo. – Sixth Annual Mathematical Programming Seminar and Meeting sponsored by the MaGen User Group. Contact: George M. Lowell, Symposium Director, Haverly Systems Inc., 4 Second Ave., Denville, N.J. 07834.

Aug. 29-Sept. 2, San Francisco – Annual Conference of the Urban and Regional Information System Association (Urisa) "Information Research for an Urban Society." Contact: Donald S. Luria, Treasurer Urisa, 901 Elizabeth Ave., Suite 100, Charlotte, N.C. 28204.

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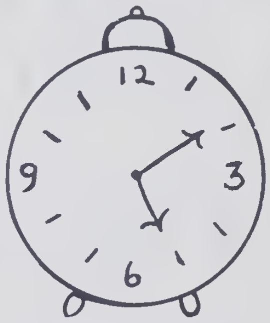

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# CI Notes

## GSA Realigns DP Operations

WASHINGTON, D.C. – The General Services Administration computer and telecommunications operations have been reorganized, with the establishment in the GSA of an Automated Data Processing and Communications Service (Adpacs).

The move is in line with President Nixon's management improvement program. Ted Trimmer, assistant administrator of GSA, has been named acting commissioner.

The reorganization comes after a report, prepared by Fry Consultants of Chicago, which recommended improvements in the management of GSA's government-wide computer hardware, software and related services. The General Accounting Office estimates the total cost of ADP-related activities presently ranges as high as $6 billion to $8 billion.

## NCR Signs Translator Pact

DAYTON, Ohio – The National Cash Register Co. has obtained exclusive rights to market General Computer Services, Inc.'s TCM-104 translator units in the U.S.

The translator units allow NCR 735 and 736 magnetic tape encoders to act as data collection devices with standard Bell System Touch-Tone telephones acting as remote input terminals.

## Supershorts

Venture Computer Systems, Inc., New Berlin, Wis., has selected GTE Information Systems, Service Co., to provide maintenance service for its line of computer terminals.

– – –

Computer Automation, Inc. has received new orders totaling approximately $3.1 million for its Naked Mini and Alpha minicomputers and its Capable testers. The orders from seven companies are scheduled for delivery over an 18-month period.

– – –

Computer Hardware Consultants & Services, Inc. has named Lunceford & Associates, Inc. as its sales agent for add-on memories in the eight Midwest states.

### Speculation Continues

# Independents Wary of Future IBM Models

By a CW Staff Writer

WHITE PLAINS, N.Y. – IBM's 370 virtual memory systems, expected to be called the models 147, 157 and 167, will all have solid-state memories and integrated file adapters as standard equipment, according to industry sources last week.

But announcement of the new systems may have been delayed indefinitely as a result of a court motion made last month by Telex in its antitrust suit against IBM. Industry sources earlier had predicted the announcement would be made July 6.

Although IBM is capable of changing system specifications at any time, the latest information available from non-IBM sources is that:

- The minimum memory size will be 500K, reducing the likelihood that users will be in the market for add-on memories.
- The integrated file adapter, as standard equipment, will eliminate the possibility that users could choose to install a plug-compatible controller for their first 3330. Additional 3330s would still require additional controllers.
- The systems, using the Advanced Operating System (AOS), will be able to run programs under DOS and OS concurrently without JCL changes, a mix now possible only on the 360/67.

### Telex Action

Although neither Telex nor IBM will discuss the closed-door action, industry sources said that Telex, as part of its antitrust suit, has asked the court to enjoin IBM from announcing the systems.

The motion is reported to be based on a claim that the configurations and pricing of the new systems would damage the market for add-on memories and replacement controllers.

Memory makers and disk drive manufacturers other than Telex have also expressed worries over the forthcoming announcements.

"Our intelligence shows," one said, "that the new machines will carry a price reduction in the memory area that could go as high as 30%, which would effectively close us out of competition on memory.

"We also hear that with the announcement of the new machines," he added, "IBM will offer new memory to go with the 155 and 165, also at a reduced rate from the present prices. If that reduction is 30%, which we understand it will be, they will cut us out of the 155 and 165 memory replacement market."

IBM, another source explained, would not reduce the rate of the present memory, but would offer new memory, probably of the bipolar type for those machines at a lower cost than the present core memory.

The disk makers also expressed concern that the new configuration of the 3330s and the Integrated File Adapter would amount to a de facto price reduction, estimated by one maker to be as high as 25% to 30%.

Since the independents are just gearing up for delivery of the 3330-compatible drives, he estimated the IBM move could close the market before the independents even get a foothold.

# Interdata Unveils $3,600 Mini With Complement of Features

OCEANPORT, N.J. – Interdata last week unwrapped the lowest-cost model in its "New Series" of minicomputers.

The Model 74, a 16-bit processor with a full complement of features including hardware multiply/divide, 16 general registers, 32K words of core memory, LSI ROM, up to 255 I/O interrupts and upward compatibility with other series models, carries a price tag of $3,600.

Interdata also announced the Loader Storage Unit for the New Series. The device, intended for use in remote or unattended systems, provides automatic reinitialization of the system in case of malfunction.

The Interdata 74 architecture and instruction format are said by the company to be similar to the basic IBM 360/370 processors. The instruction set for the 74 consists of 110 instructions, limiting the compatibility with the two more powerful series models, the Model 70 with 127 instructions and the Model 80 with 129.

Among those features absent in the 74 that limit the downward compatibility of the series hardware are floating point, list processing, automatic I/O channels and a TTY interface. Upward compatibility is obtained through all three models, however.

The memory is available in 4K 16-bit word modules which can be combined to provide a total of 32K words. Access time is 300 nsec with a cycle time of 1 μsec.

### I/O Can Handle 255 Devices

The Model 74 I/O system can handle as many as 255 devices over a standard multiplexer channel. The channel can handle either 8-bit or 16-bit devices, the company said. A programmed I/O loop is used to transfer data at 66 kbyte/sec. Higher-speed devices are handled over an optional selector channel which can operate at up to 2 Mbyte/sec.

The Model 74 is upward compatible with all other Interdata New Series machines as far as software is concerned. Software supplied with the 74 includes the Basic Operating System (Boss), an interactive Fortran compiler, symbolic assembler, interactive text editor and interactive debug package as well as utilities.

Initial deliveries of the Model 74 are scheduled for April 1973.

### Loader Storage Unit

The Loader Storage Unit consists of a controller, a hardware watchdog timer and from one to 16 non-volatile storage modules of 128 bytes each.

The Loader Storage Unit costs $500 plus $100 for each 128-byte storage module. First deliveries are scheduled for April 1973 from 2 Crescent Place, 07757.

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# Sperry Rand Promotes Two Top Executives After Forster's Death

NEW YORK – J. Paul Lyet was elected chairman and chief executive officer of Sperry Rand Corp., following the death of J. Frank Forster.

Lyet, president of Sperry Rand since last July, joined Sperry's New Holland farm equipment division as controller in 1943, and was named president of the division in 1969.

Robert E. McDonald, president of the Univac Division from 1966 to 1971, and executive vice-president since 1968, was named president of Sperry Rand.

Forster joined the Sperry Gyroscope Co. in 1938, and became president of Univac in 1964. He was elected president and chief executive officer of Sprrey Rand in 1965, and chairman in 1967. He was responsible for reorganizing the division into four profit centers.

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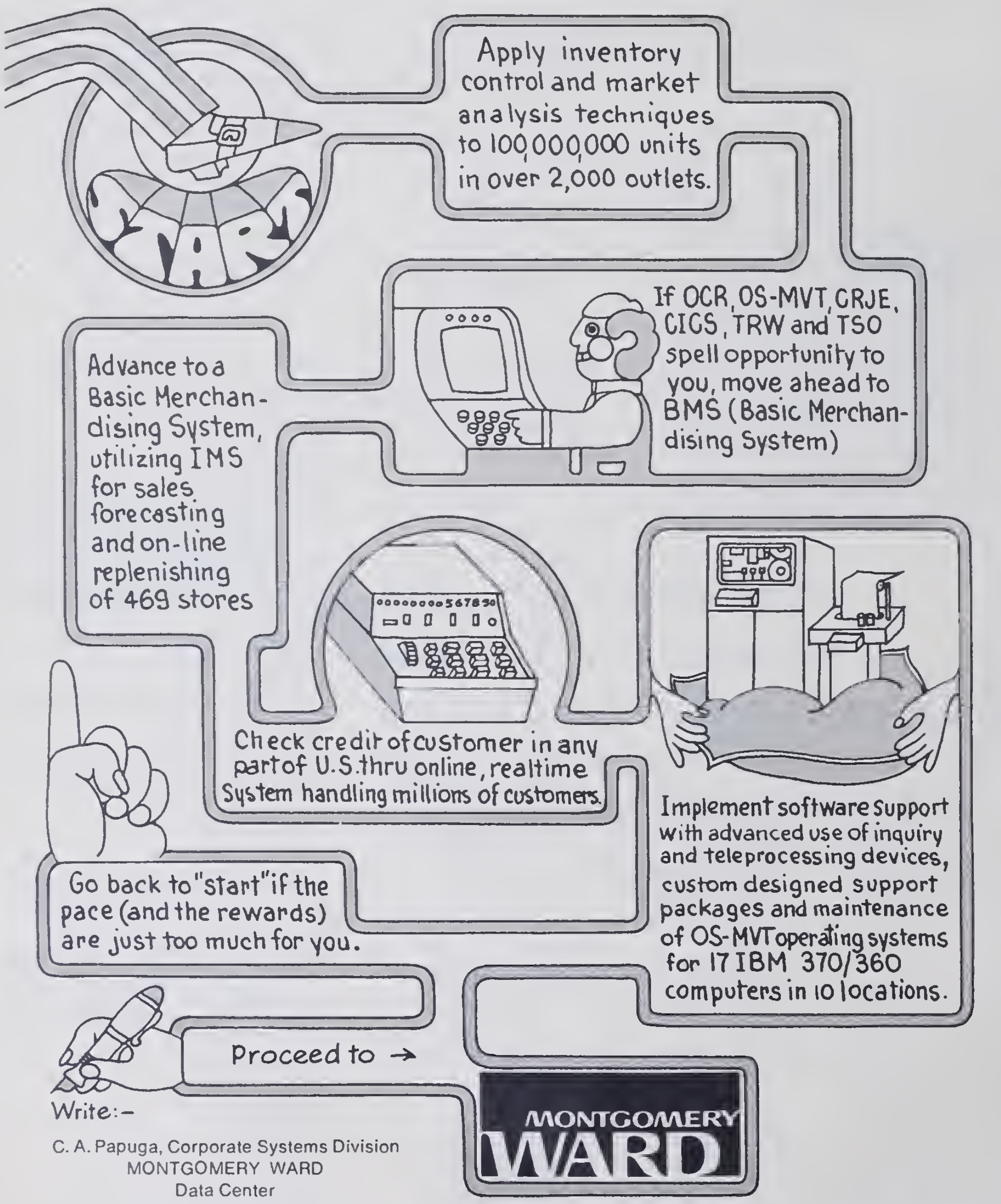
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# Ampex Ruggedized Core Memories Priced as Low as 1.2 Cent/Bit

MARINA DEL REY, Calif. – Two core memories from Ampex Corp., designed for use in hazardous environments such as mobile applications and industrial systems, are priced at from 1.2 cent/bit to 3 cent/bit.

The Ampex 1865M and 1885M memories offer cycle times of 650- and 850 nsec respectively. They are available in modules of 4K and 8K words of nine, 12, 16 or 18 bits which can be combined to provide up to 64K 36-bit words.

## Wangco Adds Tape Drives

SANTA MONICA, Calif. – Wango, Inc. (formerly Wang Computer Products) has added three models to its 1100 Series of magnetic tape drives.

The 25 in./sec Model 1125, the 37.5 in./sec Model 1137 and the 45 in./sec Model 1145 include straight-line loading, self-loading vacuum columns and IBM compatibility. Data densities are up to 800 char./in. NRZI and 1,600 char./in. PE. A dual-density 800/1,600 char./in. capability is also available.

Prices start at $3,720 in quantities of 10. Delivery is 30 days from 2400 Broadway.

## Other New Products

An option recently announced for its 300-, 600- and 1,000 card/min slant-top series M Card Readers by Documation, Inc. Melbourne, Fla., will allow switching from 51- to 80-column cards in minutes. The option costs $200.

– – –

Information Terminals, Mountain View, Calif., has introduced its "R" series cassette meeting digital data recording specifications developed by Ansi and Ecma.

– – –

Microdata, Santa Ana, Calif., is offering a 300 card/min reader system for its Micro 800 and Micro 1600 minis for $4,100.

– – –

The OLV-60 series of regulated power supplies from Elexon Power Systems, Irvine, Calif., provides 15 output voltages from 4- to 28 Vdc with current ratings of 12- to 3.4 A. They are priced from $75.

– – –

The Digitronics Corp., Southboro, Mass., has developed the asynchronous Perforated Tape Reader 2015 which operates in bidirectional read modes at speeds to 150 char./sec. It is available without electronics for $295 or with power supply and electronics for $545.

## *New OEM Products*

– – –

A miniature 13-lb. disk drive with non-positioning flying heads, and average access time of 8.5 msec is available in 8-track 145K bit and 16-track, 290K-bit versions from Information Data Systems, Walled Lake, Mich. Its data rate is 1.09 Mhz; interface signals are at TTL level. It measures 8 in. by 9 in. by 9 in.

– – –

Owens-Illinois, Inc., Toledo, Ohio, has developed an 8.5-in. square flat screen plasma alphanumeric and graphics display for word-processing applications. The Digivue units include two perpendicularly arranged sets of 512 parallel electrodes which produce over 26,000 discrete charges at a density of 3,600 site/sq. in.

– – –

The 745-0008 solid-state readout with integral TTL MSI circuit chip from Dialight Corp., Brooklyn, N.Y., is available with a .270-in. high character and left-hand decimal point. It costs $10 in 1,000 quantities.

– – –

High-speed 1K bit Shottky TTL ROMs which can be user-programmed in seconds are available from Signetics Corp., Sunnyvale, Calif., for prototpying, volume production, microprogramming, hardwired algorithms and control store. Access time is 35 nsec, the company said.

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### Research Firm Predicts

# Data Entry Approaches Multimedia Age

NEW YORK – Data entry systems will become multimedia systems in the 1970s, combining the features of OCR, terminals and present key-to-tape and shared processor systems, according to Quantum Science Corp., a computer industry market research firm here.

"Obvious market distinctions of today such as off-line versus on-line, and of key entry versus automatic transcription, will blur with the increasing use of mixed media data entry systems," the firm said.

"Capabilities offered today in pure systems such as on-line terminals, keytape, keydisks, OCR and source data entry will merge in the multimedia system," it added.

Data entry costs, the firm noted, now average 32% of U.S. computer-related expenditures and approach 40% for some users.

"Costs are rising," the group added, "because today's approach to data entry, based primarily on keypunch equipment, is labor intensive with operator costs accounting for over 80% of the total data entry expense."

Without the greatly increased use of automated techniques such as source data entry and OCR, the number of keyboard operators in the U.S. would have to triple by 1980, from 500,000 in 1971 to 1.5 million, the report noted.

The use of keydisk units and keycassette units is providing some improvements in operator efficiency, the firm noted, "but must be viewed as only the beginning of real cost savings."

The greatest potential for lowest-cost data entry lies with OCR and source data automation, the firm added, but warned that "these methods are limited to certain applications and volume levels despite their low cost."

Through 1980, the data entry segment of the market will represent the fastest growing portion of peripheral equipment shipments, the firm predicted.

"Shipments of data entry equipment including operator-oriented terminals at end-user prices will grow from $815 million in 1971 to $1.7 billion in 1976 for an average annual increase of 16%," it said.

"Source data entry," it added, "will be the fastest growing market segment, increasing fivefold from $72 million in 1971 to $405 million in 1976, boosted by increased retail point-of-sale and factory data collection applications.

"The operator-oriented on-line terminal market will grow from $321 million in 1971 to $811 million in 1976, with the major market opportunity in intelligent terminals," the research firm added.

# Australian DP Orders Still Strong Despite Generally Soft Economy

Special to Computerworld

SYDNEY, Australia – Despite the present economic recession here the business and office equipment industry remains buoyant.

Computer experts predict that the Australian industry, commerce and government will be placing orders for computer equipment worth more than $300 million a year by 1980.

Computer orders placed in the year to September 1971, amounted to over $55 million and growth rate is predicted to reach 15% a year during this decade.

Although this 15% represents a slowdown from the 25% annual growth of the 1960s, data processing continues to be one of the fastest growing industries in this country.

The recent trends toward bigger and more powerful systems will continue, industry sources said. Systems are evolving from batch processing on a single site, through batch processing associated with on-line inquiry, to complete interactive communications-based systems, they added.

# Ex-Cell-O to Phaseout XLO Computer Products; Cites Price Degradation

DETROIT – Ex-Cell-O Corp. plans to phase out the product lines of its XLO Computer Products unit.

E.J. Giblin, Ex-Cell-O president, attributed the decision to price degradation in the computer magnetic memory market and the resultant effect on the product lines and activities of the unit.

He said the phaseout will be accomplished over the period of time necessary to meet all existing customer obligations and to make an orderly disposition of the product lines involved.

This move affects manufacturing facilities in Walled Lake, Mich., and Cherry Hill, N.J.

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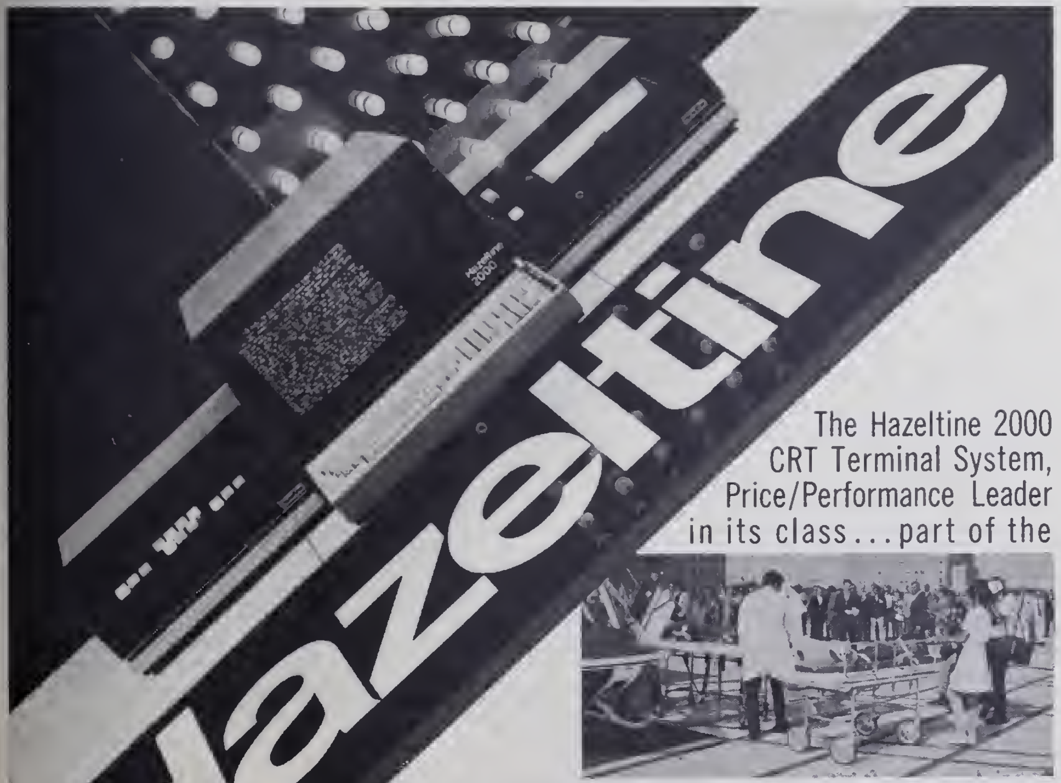

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# Nickels & Dimes

**DPA**, a computer lessor, has borrowed $7.5 million from the First National Bank in Dallas to repay the balances of several bank credits. The firm expects to have paid off its senior debts by Nov. 30, 1973.

$$$

**Memorex** has purchased $14.5 million of subordinated notes in ILC Peripherals Leasing Corp., in which it holds a 10% voting interest. Funds for the transaction came from Bank of America, which purchased $14.5 million principal amount of Memorex convertible notes, due 1977.

$$$

Goodies in the mail. **IBM** has declared a regular quarterly dividend of $1.35 per share payable Sept. 9 to holders of record Aug. 9. **Computer Installations** shareholders of record July 14 will receive a dividend of 5 cents per share on Aug. 1.

$$$

Business is up at **Hewlett-Packard**, but percentage figures "should be evaluated in light of the company's relatively weak performance in the first half of 1971," noted President William R. Hewlett. Sales for the quarter ended April 30 rose to $116.6 million, a 24% rise, and earnings reached $8.6 million, up 58%. Orders booked totaled $127.9 million, up 30% over last year's period.

$$$

**Micromation** has made a profit for the first time in history. Net earnings were $25,278 compared to a loss of $28,945 in 1971 and a loss of $500,235 in 1970.

## Government Aid Promised

# ICL Six-Month Earnings Drop 83%

LONDON – Although revenues for the first six months rose slightly at International Computers Ltd., earnings took a nosedive, dropping 83% to $1.2 million from $7 million in the period ended April 12, 1971.

At the same time the firm obtained a promise from the British Government of $37 million in development aid over the next 14 months.

New orders are up 30% from the year-earlier pace, the firm said, but added it didn't expect any improvement in the second half, since it may take some time for new orders to show up on the books as profit.

First-half revenues rose to $203.5 million from $198 million. The firm cited a "slowdown in the rate of growth" of the computer market and "special difficulties in operations in certain areas." A $4.8 million charge was for "obsolescence provisions arising from changes in the manufacturing programs and market life of products."

### Profit Problems

ICL also omitted an interim dividend, citing the profit problems and a decision to retain a higher share of the earnings.

Support from the government has been expected for some time, and ICL has been approached by other computer companies, such as Burroughs [CW, July 5]. The government, which owns 10.5% of ICL, said control of the company should remain in Britain.

# Microdata Records Sharp Earnings Jump Over Quarter, Nine Months

SANTA ANA, Calif. – Microdata Corp.'s 1972 earnings reports are shining, with figures for the three-month and nine-month periods ended May 31 showing significant turnarounds.

In the third quarter, earnings totaled $179,397 or 14 cents a share, compared with a loss of $235,001 or 20 cents a share in the same period a year ago. Sales rose to $1.6 million from $522,449 in the 1971 quarter.

Earnings showed a rise of 29% and sales 12% from the second quarter of this year.

### Earnings Soar

For the nine months ended May 31, earnings soared to $432,921 or 33 cents a share from the loss in the comparable 1971 period of $533,057 or 53 cents a share.

"Orders and shipments continue to be steady, and prospects for futher record sales and earnings for the fourth quarter are excellent," noted President Donald W. Fuller. He cited growing sales for the Micro 1600 mini and the addition of peripherals and software to the product line.

Microdata has entered into a marketing agreement with Tecnica Education Corp. whereby Tecnica will recommend Microdata computers in support of sales to the educational market.

# Fabritek Cuts Size Of Loss for Year

MINNEAPOLIS – Year-end figures at Fabritek, Inc. show slipping revenues but a reduction in losses, aided by a $1.9 million special credit.

The loss for the year ended March 31 was slashed to $672,514 or 21 cents a share, compared to last year's $2.8 million or 87 cents a share. Revenues declined to $13.6 million from $15.2 million.

In the nine months ended Jan. 1, Fabritek posted a profit of $412,300 or 13 cents a share, with help from a special credit resulting from the sale of Fabritek Microsystems, Inc., Nicolet Instrument Corp., and transactions in the company's debenture bonds.

"The decrease in revenue during 1972 was due, in part, to our increasing activities in the leasing of extension memories rather than outright sales," President M.F. Mickelson said.

"In the first three months of the current fiscal year, as much equipment has already been installed as was installed throughout the last fiscal year."

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# Computerworld Stock Trading Summary

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CLOSING PRICES THURSDAY, JULY 13, 1972

SOFTWARE & EDP SERVICES

| EXCH | | 1972 RANGE (1) | CLOSE JUL 13 1972 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | ADVANCEO COMP TECH | 1- 2 | 1 1/2 | + 1/4 | +20.0 |
| A | APPLIEO DATA RES. | 4- 7 | 4 5/8 | + 1/4 | +5.7 |
| O | APPLIEO LOGIC | 1- 4 | 2 5/8 | 0 | 0.0 |
| N | AUTOMATIC OATA PROC | 72- 93 | 92 1/4 | - 1/8 | -0.1 |
| O | BRANDON APPLIED SYST | 1- 2 | 1 1/8 | - 1/8 | -10.0 |
| O | COMPUTER DIMENSIONS | 8- 14 | 8 1/4 | -1 1/4 | -13.1 |
| O | COMPUTER DYNAMICS | 1- 4 | 1 1/4 | 0 | 0.0 |
| O | COMPUTER NETWORK | 4- 7 | 5 | + 1/2 | +11.1 |
| N | COMPUTER SCIENCES | 6- 10 | 6 1/8 | - 3/8 | -5.7 |
| O | COMPUTER TECHNOLOGY | 6- 8 | 5 1/2 | 0 | 0.0 |
| O | COMPUTER USAGE | 9- 14 | 9 3/4 | 0 | 0.0 |
| O | COMP AUTOMOT REPORTS | 5- 9 | 4 3/4 | 0 | 0.0 |
| N | COMPUTING & SOFTWARE | 17- 28 | 17 3/8 | - 5/8 | -3.4 |
| O | COMRESS | 1- 3 | 1 3/4 | - 1/4 | -12.5 |
| O | COMSHARE | 5- 10 | 7 | 0 | 0.0 |
| O | OATATAB | 5- 9 | 6 | 0 | 0.0 |
| O | EOP RESOURCES | 3- 8 | 3 3/8 | - 3/8 | -10.0 |
| A | ELECT COMP PROG | 3- 5 | 2 5/8 | - 1/8 | -4.5 |
| N | ELECTRONIC DATA SYS. | 43- 65 | 50 | -11 1/8 | -18.2 |
| O | INFORMATICS | 7- 11 | 6 7/8 | - 1/2 | -6.7 |
| O | I.O.A. DATA CORP | 1- 3 | 2 1/2 | - 1/8 | -4.7 |
| A | ITEL | 8- 12 | 8 1/2 | +1 | +13.3 |
| O | KEANE ASSOCIATES | 4- 7 | 5 | + 1/4 | +5.2 |
| O | KEYDATA CORP | 7- 13 | 13 | + 1/8 | +0.9 |
| O | LOGICON | 4- 9 | 7 | + 1/8 | +1.8 |
| A | MANAGEMENT DATA | 6- 10 | 6 | -1 | -14.2 |
| O | NATIONAL CSS INC | 8- 25 | 19 1/2 | -1 1/2 | -7.1 |
| P | ON LINE SYSTEMS INC | 8- 20 | 17 5/8 | -2 | -10.1 |
| N | PLANNING RESEARCH | 11- 17 | 10 1/2 | - 5/8 | -5.6 |
| O | PROGRAMMING METHODS | 20- 24 | 20 1/2 | - 3/4 | -3.5 |
| O | PROGRAMMING & SYS | 1- 2 | 1 1/4 | 0 | 0.0 |
| O | SCIENTIFIC COMPUTERS | 3- 4 | 2 1/2 | - 1/8 | -4.7 |
| O | SIMPLICITY COMPUTER | 1- 5 | 3 1/4 | - 1/8 | -3.7 |
| O | TBS COMPUTER CENTERS | 4- 6 | 4 7/8 | - 3/4 | -13.3 |
| O | TRACOR COMPUTING | 2- 3 | 1 1/2 | - 1/4 | -14.2 |
| O | TYMSHARE INC | 7- 10 | 7 3/4 | - 1/2 | -6.0 |
| O | UNITED OATA CENTER | 5- 8 | 6 1/2 | 0 | 0.0 |
| N | UNIVERSITY COMPUTING | 18- 26 | 18 | -1 3/8 | -7.0 |
| A | URS SYSTEMS | 6- 10 | 8 3/8 | - 1/8 | -1.4 |
| O | VORTEX CORP | 2- 5 | 2 1/4 | 0 | 0.0 |

PERIPHERALS & SUBSYSTEMS

| EXCH | | 1972 RANGE (1) | CLOSE JUL 13 1972 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| N | ADDRESSOGRAPH-MULT | 34- 45 | 43 3/4 | 0 | 0.0 |
| O | ADVANCEO MEMORY SYS | 12- 23 | 19 3/4 | -2 | -9.1 |
| N | AMPEX CORP | 7- 15 | 7 1/8 | - 3/8 | -5.0 |
| O | ANDERSON JACOBSON | 5- 8 | 4 3/4 | - 5/8 | -11.6 |
| O | ATLANTIC TECHNOLOGY | 1- 11 | 2 7/8 | - 1/8 | -4.1 |
| A | BOLT,BERANEK & NEW | 5- 21 | 17 7/8 | -2 3/4 | -13.3 |
| N | BUNKER-RAMO | 9- 14 | 11 7/8 | - 7/8 | -6.8 |
| A | CALCOMP | 17- 25 | 17 3/4 | -1 3/8 | -7.1 |
| O | CENTRONICS DATA COMP | 11- 53 | 48 | +1 | +2.1 |
| O | COGNITRONICS | 3- 5 | 4 1/4 | + 1/4 | +6.2 |
| O | COMPUTER COMMUN. | 2- 7 | 3 1/8 | + 1/8 | +4.1 |
| A | COMPUTER EQUIPMENT | 3- 4 | 3 | - 1/8 | -4.0 |
| O | COMPUTER MACHINERY | 7- 13 | 10 7/8 | - 3/4 | -6.4 |
| A | COMPUTEST | 5- 9 | 4 7/8 | - 3/8 | -7.1 |
| A | DATA PRODUCTS CORP | 5- 7 | 4 5/8 | - 1/8 | -2.6 |
| O | OATA RECOGNITION | 3- 5 | 2 3/4 | 0 | 0.0 |
| O | OATA TECHNOLOGY | 3- 5 | 3 1/4 | - 3/8 | -10.3 |
| O | DI/AN CONTROLS | 0- 8 | 5 3/4 | + 1/8 | +2.2 |
| O | DIGITRONICS | 2- 4 | 2 1/2 | + 1/4 | +11.1 |
| N | ELECTRONIC M & M | 5- 8 | 5 1/8 | - 3/8 | -6.8 |
| O | FABRI-TEK | 2- 5 | 3 | - 1/4 | -7.6 |
| O | GENERAL COMPUTER SYS | 7- 16 | 13 1/2 | 0 | 0.0 |
| N | GENERAL ELECTRIC | 59- 70 | 64 | -2 3/4 | -4.1 |
| N | HAZELTINE CORP | 9- 13 | 9 5/8 | - 1/2 | -4.9 |
| O | INFOREX INC | 28- 47 | 39 | -2 1/2 | -6.0 |
| O | INFORMATION DISPLAYS | 2- 5 | 1 7/8 | - 1/8 | -6.2 |
| A | LUNOY ELECTRONICS | 10- 14 | 9 7/8 | - 3/8 | -3.6 |
| O | MANAGEMENT ASSIST | 1- 2 | 5/8 | - 1/8 | -16.6 |
| N | MEMOREX | 24- 38 | 24 1/2 | -2 1/8 | -7.9 |
| A | MILGO ELECTRONICS | 17- 44 | 37 | -3 1/4 | -8.0 |
| N | MOHAWK DATA SCI | 19- 27 | 19 | -1 | -5.0 |
| O | OPTICAL SCANNING | 7- 16 | 10 | - 1/4 | -2.4 |
| O | PERTEC CORP | 9- 17 | 9 | + 1/4 | +2.8 |
| O | PHOTON | 7- 15 | 10 1/4 | -1 5/8 | -13.6 |
| A | POTTER INSTRUMENT | 13- 21 | 13 1/8 | -1 | -7.0 |
| O | PRECISION INST. | 7- 13 | 8 1/4 | - 1/2 | -5.7 |
| O | RECOGNITION EQUIP | 8- 15 | 9 1/4 | 0 | 0.0 |
| N | SANDERS ASSOCIATES | 13- 21 | 13 3/8 | - 5/8 | -4.4 |
| O | SCAN DATA | 7- 13 | 8 1/4 | + 1/4 | +3.1 |
| O | STORAGE TECHNOLOGY | 17- 39 | 32 1/2 | -4 | -10.9 |
| O | SYCOR INC | 7- 11 | 9 | - 1/2 | -5.2 |
| O | TALLY CORP. | 8- 15 | 12 1/4 | - 1/8 | -1.0 |
| N | TEKTRONIX INC | 34- 60 | 57 3/8 | -2 5/8 | -4.3 |
| N | TELEX | 8- 15 | 8 1/2 | 0 | 0.0 |
| O | WILTEK INC | 10- 26 | 19 1/2 | + 1/2 | +2.6 |

SUPPLIES & ACCESSORIES

| EXCH | | 1972 RANGE (1) | CLOSE JUL 13 1972 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | BALTIMORE BUS FORMS | 6- 9 | 6 1/2 | 0 | 0.0 |
| A | BARRY WRIGHT | 9- 13 | 11 1/2 | + 3/4 | +6.9 |
| A | OATA DOCUMENTS | 17- 26 | 20 7/8 | - 1/2 | -2.3 |
| O | OUPLEX PROOUCTS INC | 9- 16 | 8 7/8 | - 1/4 | -2.7 |
| N | ENNIS BUS. FORMS | 7- 10 | 8 | - 5/8 | -7.2 |
| O | GRAHAM MAGNETICS | 15- 27 | 18 | - 1/2 | -2.7 |
| O | GRAPHIC CONTROLS | 12- 15 | 11 3/4 | -1 | -7.8 |
| N | 3M COMPANY | 76-158 | 78 1/4 | -2 1/2 | -3.0 |
| O | MOORE BUS. FORMS | 42- 55 | 52 7/8 | - 1/4 | -0.4 |
| N | NASHUA CORP | 48- 56 | 53 1/4 | + 3/8 | +0.7 |
| O | REYNOLOS & REYNOLD | 37- 77 | 39 1/4 | - 1/2 | -1.2 |
| O | STANDARD REGISTER | 14- 20 | 14 1/2 | - 7/8 | -5.6 |
| O | TAB PRODUCTS CO | 14- 17 | 15 1/4 | 0 | 0.0 |
| N | UARCO | 23- 28 | 23 | -1 3/8 | -5.6 |
| A | WABASH MAGNETICS | 8- 11 | 8 5/8 | - 1/8 | -1.4 |
| N | WALLACE BUS FORMS | 22- 26 | 24 | - 3/4 | -3.0 |

COMPUTEP SYSTEMS

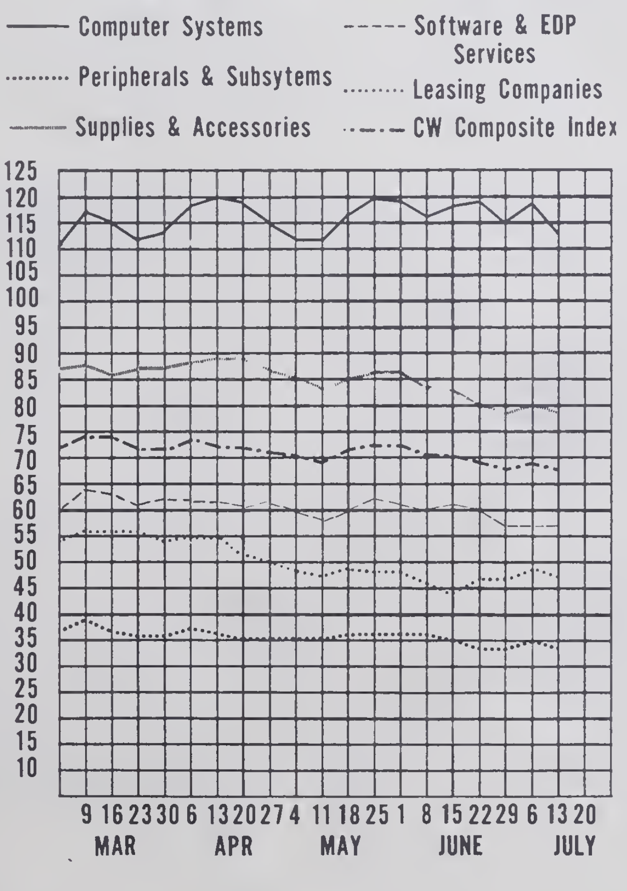
| EXCH | | 1972 RANGE (1) | CLOSE JUL 13 1972 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| N | BURROUGHS CORP | 147-192 | 183 | -8 | -4.1 |
| N | COLLINS RADIO | 14- 20 | 14 1/4 | 0 | 0.0 |
| N | CONTROL OATA CORP | 43- 78 | 72 | -5 3/4 | -7.3 |
| O | DATA GENERAL CORP | 56- 99 | 97 1/2 | -1 1/2 | -1.5 |
| O | OIGITAL COMP CONTROL | 10- 25 | 10 1/2 | -1 3/4 | -14.2 |
| N | DIGITAL EQUIPMENT | 72- 97 | 80 1/4 | -4 1/4 | -5.0 |
| N | ELECTRONIC ASSOC. | 6- 13 | 10 3/8 | - 1/4 | -2.3 |
| A | ELECTRONIC ENGINEER. | 8- 14 | 7 3/4 | 0 | 0.0 |
| N | FOXBORO | 28- 41 | 30 | +1 | +3.4 |
| O | GENERAL AUTOMATION | 13- 29 | 25 1/4 | -3 1/4 | -11.4 |
| O | GRI COMPUTER CORP | 3- 5 | 4 1/2 | - 1/4 | -5.2 |
| N | HEWLETT-PACKARD CO | 46- 72 | 70 3/8 | - 1/4 | -0.3 |
| N | HONEYWELL INC | 130-158 | 149 1/2 | -5 7/8 | -3.7 |
| N | IBM | 333-404 | 391 3/4 | -12 | -2.9 |
| O | INTERDATA INC | 8- 16 | 11 | -1 1/8 | -9.2 |
| O | MICRODATA CORP | 5- 10 | 9 3/4 | + 1/2 | +5.4 |
| N | NCR | 29- 35 | 31 | -2 | -6.0 |
| N | RAYTHEON CO | 36- 47 | 36 | -1 1/4 | -3.3 |
| N | SPERRY RAND | 30- 44 | 40 | -3 1/8 | -7.2 |
| A | SYSTEMS ENG. LABS | 11- 16 | 11 1/4 | - 7/8 | -7.2 |
| N | VARIAN ASSOCIATES | 14- 18 | 14 | - 5/8 | -4.2 |
| N | VICTOR COMPTOMETER | 15- 24 | 18 1/2 | -1 5/8 | -8.0 |
| N | WANG LABS. | 35- 61 | 43 1/4 | -16 3/4 | -27.9 |
| N | XEROX CORP | 121-159 | 147 | -5 5/8 | -3.6 |

LEASING COMPANIES

| EXCH | | 1972 RANGE (1) | CLOSE JUL 13 1972 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| A | BOOTHE COMPUTER | 7- 18 | 7 | - 1/2 | -6.6 |
| O | BRESNAHAN COMP. | 2- 3 | 2 1/8 | - 1/8 | -5.5 |
| O | COMOISCO INC | 3- 18 | 17 1/2 | - 1/2 | -2.7 |
| O | COMPUTER EXCHANGE | 2- 3 | 1 3/4 | 0 | 0.0 |
| A | COMPUTER INVSTRS GRP | 8- 14 | 10 3/8 | - 7/8 | -7.7 |
| N | DPF INC | 6- 13 | 6 1/8 | - 1/8 | -2.0 |
| M | OATRONIC RENTAL | 3- 4 | 2 7/8 | - 1/4 | -8.0 |
| A | DCL INC | 5- 10 | 6 | - 3/8 | -5.8 |
| A | DEARBORN-STORM | 18- 26 | 19 1/4 | -1 1/4 | -6.0 |
| A | OPA, INC. | 5- 8 | 5 7/8 | 0 | 0.0 |
| A | GRANITE MGT | 7- 11 | 7 3/8 | - 3/4 | -9.2 |
| A | GREYHOUND COMPUTER | 7- 11 | 6 7/8 | - 3/8 | -5.1 |
| N | LEASCO CORP | 17- 24 | 17 3/8 | -1 3/4 | -9.1 |
| O | LEASPAC CORP | 9- 15 | 9 1/2 | + 3/4 | +8.5 |
| O | LECTRO MGT INC | 2- 4 | 1 3/8 | - 1/8 | -8.3 |
| O | NCC INDUSTRIES | 7- 11 | 7 3/8 | - 1/4 | -3.2 |
| A | ROCKWOOO COMPUTER | 3- 7 | 3 1/8 | 0 | 0.0 |
| O | SYSTEMS CAPITAL | 3- 20 | 19 | - 7/8 | -4.4 |
| N | U.S. LEASING | 19- 33 | 27 3/4 | -2 1/2 | -8.2 |

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

## Computer Stocks Trading Index



## Earnings Reports

### URS SYSTEMS
Three Months Ended April 30

| | 1972 | a1971 |
|---|---|---|
| Shr Ernd | $.10 | $.05 |
| bRevenue | 4,863,000 | 4,247,000 |
| Loss Disc Op | ..... | 15,000 |
| Spec Cred | ..... | 26,000 |
| Earnings | 260,000 | 119,000 |
| 6 Mo Shr | .19 | .10 |
| Revenue | 9,323,000 | 7,952,000 |
| Loss Disc Op | ..... | 36,000 |
| Spec Cred | ..... | 26,000 |
| Earnings | 488,000 | 262,000 |

a-Restated. b-Excludes $250,000 in 1972 and $1,500,000 in 1971 from operations now sold or being discontinued.

### COMPUTER SCIENCES
Year Ended March 31

| | 1972 (000) | a1971 (000) |
|---|---|---|
| Shr Ernd | ..... | $.22 |
| Revenue | $127,564 | 113,981 |
| Earnings | b(37,508) | 2,932 |
| 3 Mo Shr | ..... | .04 |
| Revenue | 31,054 | 30,976 |
| Earnings | b(41,218) | 548 |

a-Restated to include equity in less than 50% owned affiliates. b-Includes deferred costs and writedowns of $62.8 million, and share of operating losses of affiliates of $4.1 million.

### SCAN DATA
Three Months Ended March 31

| | 1972 | 1971 |
|---|---|---|
| Revenue | $1,238,581 | $499,711 |
| Loss | 47,196 | 435,504 |

### ELECTRONIC ASSISTANCE
Three Months Ended April 30

| | 1972 | 1971 |
|---|---|---|
| Shr Ernd | ..... | $.07 |
| Revenue | $9,035,000 | a8,867,000 |
| Earnings | (360,000) | 131,000 |

a-Restated.

### DEARBORN-STORM
Three Months Ended April 30

| | 1972 | 1971 |
|---|---|---|
| Shr Ernd | $.42 | a$.34 |
| Revenue | 11,354,000 | 9,105,000 |
| Earnings | 1,143,000 | 895,000 |
| 6 Mo Shr | .82 | a.65 |
| Revenue | 21,929,000 | 18,161,000 |
| Earnings | 2,208,000 | 1,777,000 |

a-Adjusted for a two-for-one stock split in November 1971.

### COMPUTER TERMINAL
Nine Months Ended May 2

| | 1972 | 1971 |
|---|---|---|
| Revenue | $3,125,000 | $2,294,000 |
| Loss | 1,927,000 | 2,498,000 |

### COMPUTER COMMUNICATIONS
Three Months Ended March 31

| | 1972 | a1971 |
|---|---|---|
| Shr Ernd | $.01 | ..... |
| Revenue | 2,148,357 | $906,476 |
| Loss Disc Op | ..... | 633,889 |
| Earnings | 15,218 | (1,042,574) |
| 9 Mo Rev | 5,599,470 | 2,634,058 |
| Disc Op | 39,469 | (1,106,748) |
| Loss | 901,479 | 2,332,335 |

a-Restated by company.

## Stock Table Note

Last week, as a result of an error in the "pink sheets," Computer Dynamics was reported to have dropped to 3/4. Brush-Slocumb, San Francisco, which makes a market in the stock, reports that the company should have been reported at 1-3/4.

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